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ST GRAPHICS

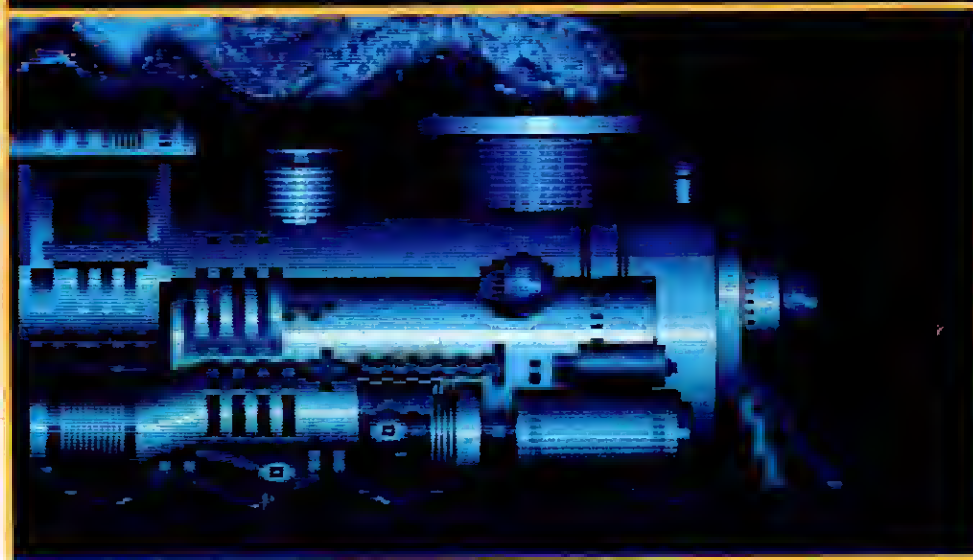
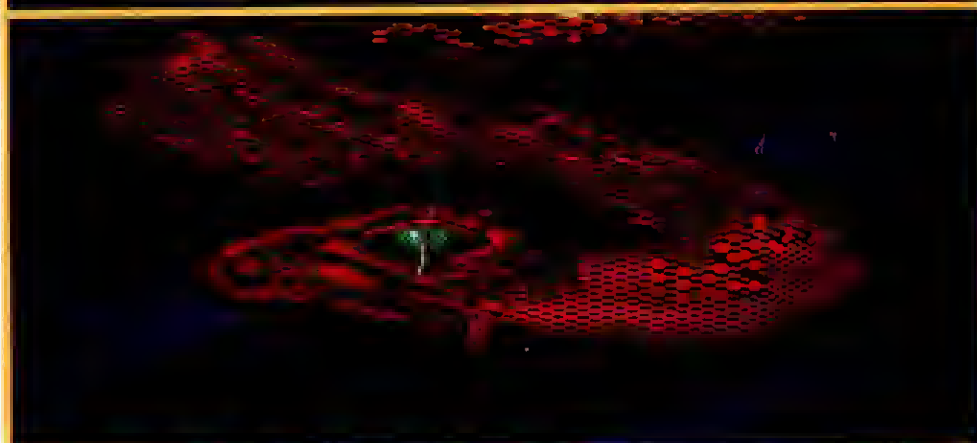
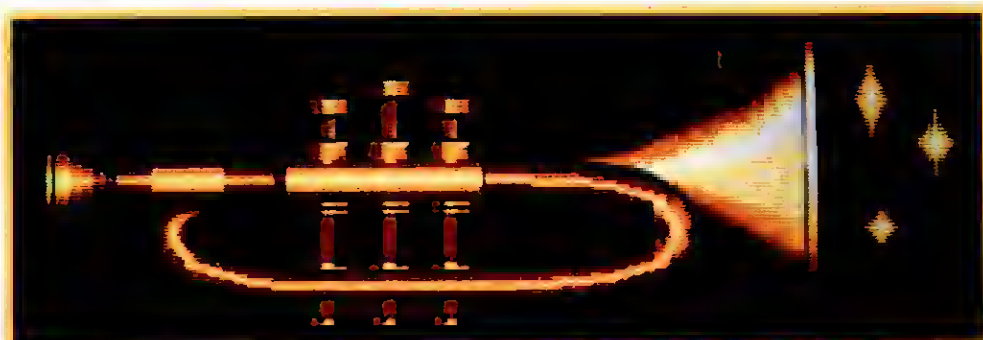
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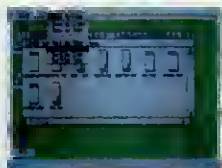
AMERICA WE BUILT IT FOR YOU THE ATARI 520ST

"We promised. We delivered. With pride, determination, and good old ATARI know how." *Sam Tramiel, President, ATARI CORP.*

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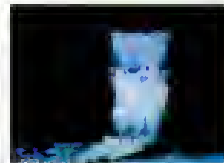


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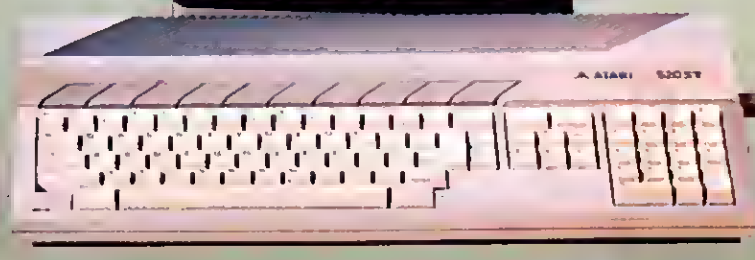
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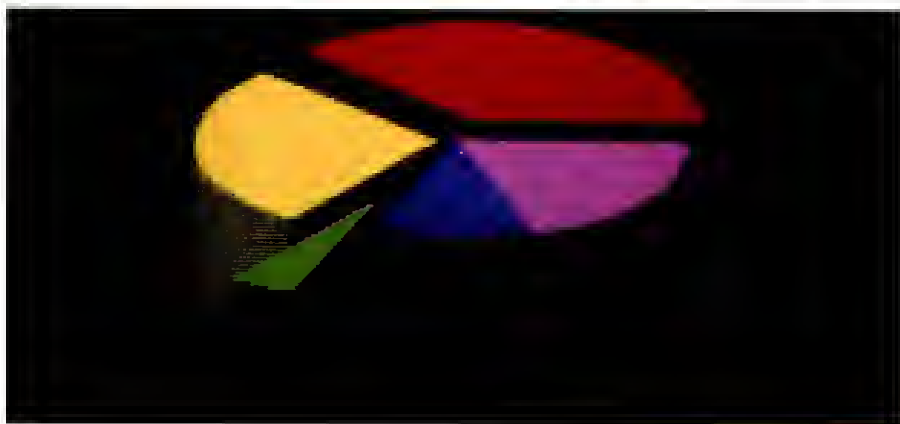
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ATARI EXPLORER™

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Sig Schreyer



Donald Thompson

INSIDE NEWS

With new Atari products ready for market—and the whole world waiting—it's time for the sales force to gear up. With the hiring of a Vice President and General Manager for U.S. Operations and a National Sales Manager, Atari is launching a national sales campaign centering on a brand new sales force of manufacturers reps.

Both new executives are pros at computer sales and both started their high-tech sales careers with Atari products.

Sig Schreyer is the Vice President and General Manager for U.S. Operations. He came on board on May 1 to oversee U.S. sales, marketing, and general administration. In other words, the movement of Atari products from dock to den for the entire U.S.

Schreyer sees his position like this: "Atari is a small company right now, but it will most assuredly become a major force in this business soon. I know the marketplace. I am interviewing reps who will go out and reach the marketplace for us. And I will insure continuity in our marketing and sales."

"When I ran my manufacturer's rep company, Atari computers outsold any other computer in our area, the mountain states," Schreyer said. Schreyer's firm, SAI, was one of the first manufacturers representatives to sell Atari products. They signed on with Nolan Bushnell's Atari in early 1977 in the Pong era until 1984, when Schreyer moved to Silver Reed as its Vice Presi-

dent for computer Peripherals.

In addition his familiarity with the Atari product line, Schreyer worked with Jack Tramiel (Atari's Chairman) at Commodore International.

"Jack Tramiel hasn't changed a bit in 15 years. He changes his mind quickly depending on conditions in the marketplace, but is always true to his philosophy of delivering the best value to his customers."

According to Tramiel, "Sig believes in what he does. I respect the man and the way he works, and he has my full support."

On July 1st, Don Thompson returned to Atari as the new National Sales Manager, in charge of coordinating the efforts of Atari's sales representatives nationwide.

Thompson's high-tech career began with the Atari sales organization in 1976. Don started as a Regional Sales Manager and was promoted to National Sales Manager and then Director of Sales.

In 1979 he founded his own sales company, Thompson Associates in Michigan. In 1982, he co-founded Starpath Corp., makers of hardware and software for the Atari 2600 (VCS). From there Don became Vice president and Director of Consumer Products for American Education Computers, a producer of curriculum software for Atari and other computers.

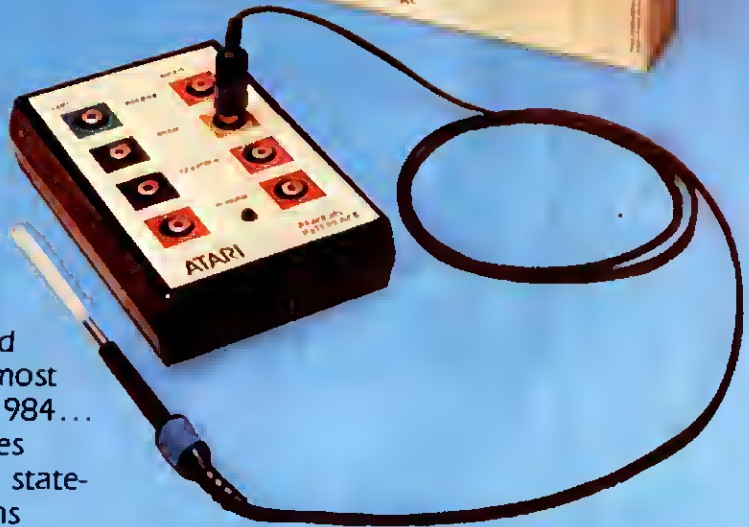
"The Atari name still has magic. I am excited to be working with the company again."

"THE BEST 1984 MICROCOMPUTER SOFTWARE"

...Classroom Computer Learning Magazine



CLASSROOM
COMPUTER
LEARNING
SOFTWARE
AWARD
WINNER



There are dozens of reasons to buy an ATARI Computer. And the ATARILAB™ Starter Set is just one. Not merely because it was selected by teachers, software developers, and instructional media designers as the most outstanding educational software in 1984... but also because ATARILAB exemplifies Atari's dedication to perfection. From state-of-the-art affordable computer systems to beneficial software, Atari is quickly being regarded as the first in the class!

Developed by Dickenson College for Atari, this incredible educational kit will help all computer enthusiasts— young or old— gain fascinating insights into the mysteries of science.

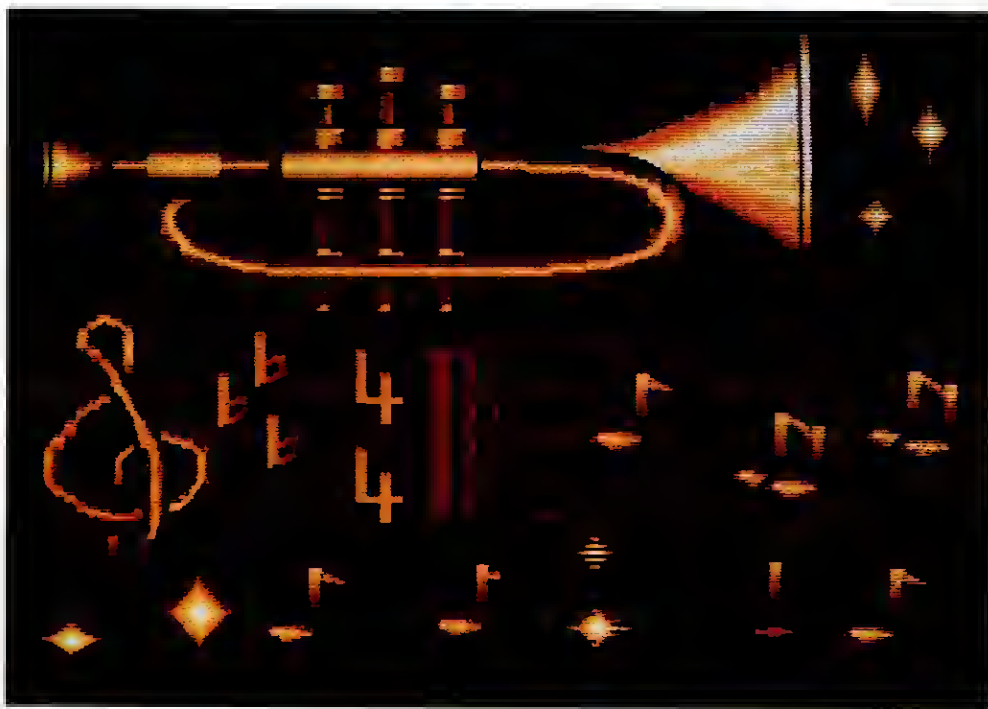
The STARTER KIT comes with everything you need, including it's own electronic thermometer and sensor to send temperature readings directly to your ATARI Computer. There are no limits to the exciting discoveries you can make with your ATARILAB Starter Set. And you can grow with it.

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ST GRAPHICS



The ST is the latest personal computer system from Atari. It is based on the 68000 microprocessor chip from Motorola—the same chip found in Apple's Macintosh.

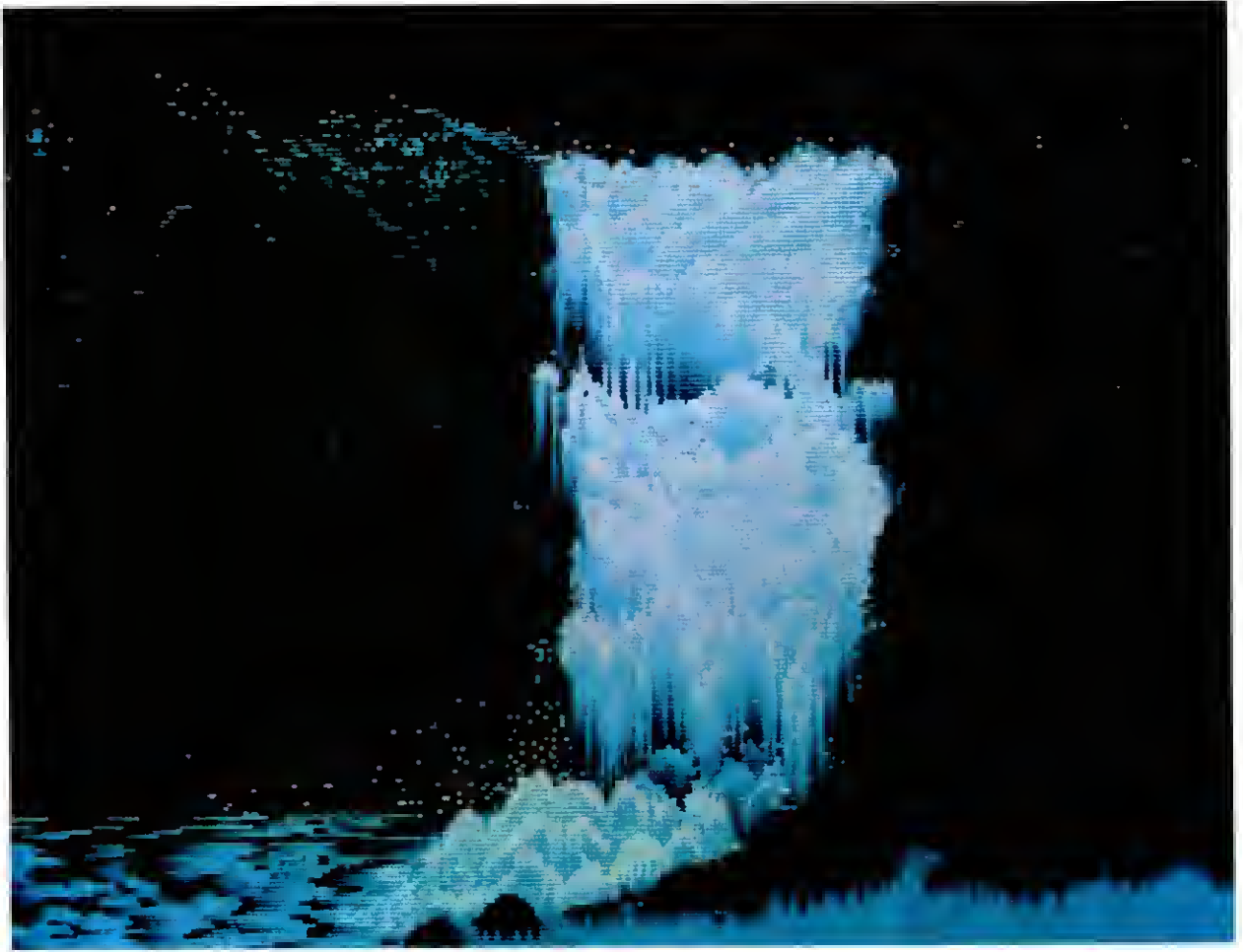
Unlike the Mac, the ST also features full color, with 512 different shades to choose from. The ST palette holds your choice of any 16 colors (or 4 colors when using medium resolution). In high resolution monochrome,

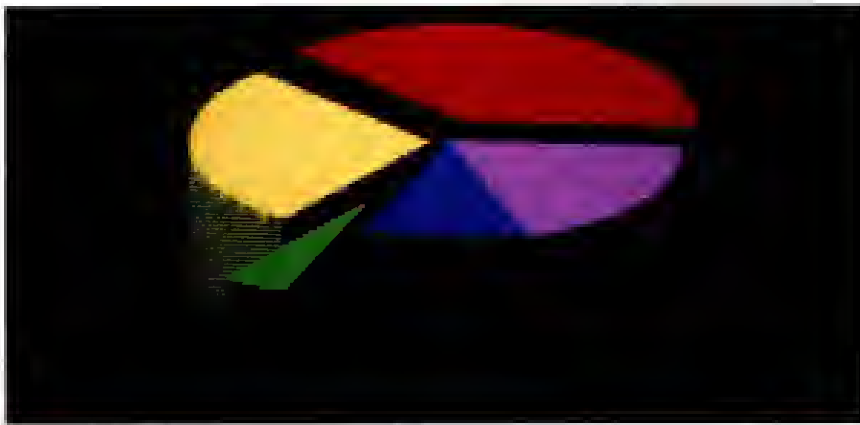
the ST's 640 by 400 resolution is about 50% more than Mac's 512 by 342—screen images look more like slide projections than computer graphics.

How can it do all that?

The advanced operation of the ST is made possible by several technological advances—the 68000 microprocessor and the custom

by Neil Harris





ST Drawings

Accompanying this article are a set of color pictures photographed from an ST. Before advancing too far into the mechanics of programming graphics, we shouldn't skip the short cuts.

The waterfall is unique and is probably the first picture entirely drawn on the ST. It was created using a drawing utility under development in Atari's engineering department. With this program you can manipulate the color palette, draw freehand on the screen by moving and clicking the mouse, and save to disk. Some advanced functions include moving rectangular blocks around the screen like a rubber stamp, and the ability to animate the color palette. Eventually it looks

like this program will make it to the marketplace as a tool for professional graphic artists.

All the pictures included *except* for the waterfall were created on the old faithful Atari 800XL in GTIA mode that produces 16 shades of one color. Since the ST's resolution is more than 4 times better than GTIA mode (which is only 80 by 192), some parts of the pictures were retouched on the ST for smoother lines—and some parts were not. That's the reason for the jaggedness of some of the lines. The colors were also enhanced on the ST since we're not limited to shades of a single color, but have all 512 to choose from when selecting our palette of 16 colors.

video and dma chips on the hardware side, and TOS (for The Operating System) on the software side.

The 68000 runs at 8 megahertz (8 million cycles per second)—four times faster than the workhorse 6502 in your 800-family computer. Not only does the processor run faster but it can do more—load data 16-bits at a time instead of 8, and perform calculations 32-bits at a time instead of 8.

The 68000 is especially good at moving hunks of memory around. Since the video screen actually is created from part of the computer's memory, the ability to switch memory around in a hurry lets the ST create spectacular animation. Even when you're just using the desktop it is impressive—windows open and move around in an eyeblink.

Part of this graphic performance is due to the custom circuitry in the ST. You may notice when looking at older 68000 computers that some graphics and disk operations are kind of slow. The ST was designed to look at those operations and come up with the better solution. For instance, most of the time the ST's video chip does *not* need to steal cycles from the processor (which would slow down its performance)—the video chip reads the screen memory in phase with the 68000, and no time is lost.

Logo Graphics

In my experience there's no easier way to get into a computer than to play with turtle graphics in Logo. It is simple in Logo to write short programs that do a lot.

The ST's Logo environment lends itself particularly well to this kind of experimenting. Logo runs in several windows at once—a command window for typing in instructions, a graphics window to watch the programs work, an editing window and a tracing window for debugging. You can stop any program in its tracks and fiddle with its innards—then send it on its merry way. It seems impossible but it works.

My first experiment was a standard program called Squirrel which draws a kind of square spiral shape. The program goes like this:

```
TO DO.SQUIRAL :SIZE
FD :SIZE
RT 90
DO.SQUIRAL 2+ :SIZE
```

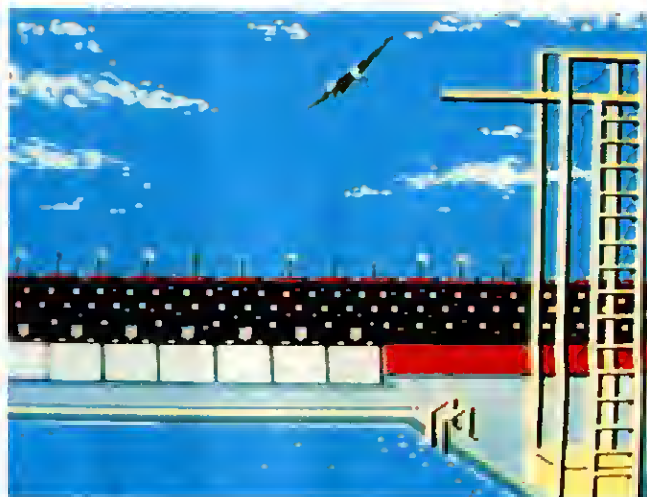
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The Games of Summer

by Arnie Katz and Bill Kunkel



Pole Vaulting



Diving

Every four years, America renews its well-documented love affair with the Olympic Games. We love the international sports festival despite the tit-for-tat boycotts of the last two summer games, spotty performance by U.S. athletes, and the inclusion of such earth-shaking events as the floor exercise.

SUMMER GAMES and DECATHLON both attempt to replicate the grandeur as well as the physical challenge of Olympic competition. These multi-event simulations excel at providing a wide variety of sports action.

A full-dress re-creation of the traditional opening ceremony signals the start of SUMMER GAMES. Once the disk boots, a torchbearer lopes into the stadium to light the symbolic flame as a covey of doves takes to the skies above the jam-packed stadium, and the Olympic anthem blares forth.

Would-be participants must take care of a little business before actually beginning to play. Each gamer types his or her name when prompted to do

Olympian Heights

Summer Games and Decathlon

so and then selects a country to represent by positioning a cursor over the selected nation's flag. The program plays a few bars of your adopted country's national anthem and switches to the events menu screen.

Armchair Olympians can practice any or all of the events or try one or more of them "for real." The program maintains record scores in each event as handy reference for competitors who want to know how they're doing.

Diving is the most successful simulation in SUMMER GAMES. The graphic display for this event, which includes the high platform and a well-articulated diver shown in side perspective, is striking. The gamer guides the

athlete from diving board to splash with the joystick, which dictates the tucks, spins, and other gyrations that go into a medal-worthy plunge.

Relatively few computer games reach as high an aesthetic level as Diving in SUMMER GAMES. Though this event is no pushover, the rewards are gratifying enough to make practicing worthwhile.

The Relay is one track event in which timing is more important than joystick-jiggling. Learning the exact moment to pass the baton can turn defeat into victory.

The 100m Dash is less interesting. Like many video footraces, its play-mechanic consists of jiggling the joystick as fast as humanly possible. The faster the gamer wiggles the stick from side to side, the faster the on-screen runner flashes down the track.

Gymnastics, like the diving event, requires the computerist to master a series of specific joystick manipulations. The horse vault, however, is somewhat easier to learn and offers

slightly less chance to express the artistry of the event. The video vaulter runs up to the springboard and leaps onto the exercise horse. As with the other events, the display utilizes large, well-drawn characters shown in side-perspective. This makes it fairly easy to follow the action as it unfolds on the screen.

The Freestyle Relay and 100m swimming races use a play mechanic that is quite a technical improvement over alternative screens. There is some loss of player involvement, but the overall effect is excellent.

The system employed in both events is the same. When a swimmer's cupped hand scythes into the water, the player hits the joystick's action button. This adds power to the cutting stroke and pushes the swimmer through the water.

Skeet shooting is the joker in this deck. It's a clever target game which uses a sighting cursor as a rifle scope. The targets are clay disks that the program launches from the sides of the screen. The graphics are not as sensational as SUMMER GAMES' more spectacular attractions, but they are serviceable and appropriate.

DECATHLON is a more focused concept. Instead of simulating a pot-pourri of Olympic contests, this cartridge is exclusively devoted to the ten tests that comprise the greatest challenge in modern athletic competition.

DECATHLON was the first track and field game. In fact, it made its debut as a program for the Atari 2600 programmable video game system.

Pioneering is a double-edged sword. Being first puts you in front of the pack, but it also prevents the trailblazer from profiting from others' mistakes. DECATHLON's reliance on the joystick-jiggling play mechanic is an example of what can happen. The longer races become grueling exercises in pain and boredom for arm-weary computerists.

The most entertaining portions of the program are the throwing events: the javelin toss and the discus. These use the back-and-forth motion only to build up momentum and genuinely conjure up the feel of the actual competitions. Running is also less crucial in the pole vault, another excellent simulation. ▲

SUMMER GAMES *Epyx, 1984/48K disk*

DECATHLON *Designed by David Crane
Activision, 1984/48K disk*



Start Your Electronic Engines

Baja Buggies, Pole Position, Pitstop and Rally Speedway

Fast cars and fun in the sun are a great American combination—like hot dogs and mustard, lox and bagels, and Cheech and Chong.

BAJA BUGGIES was the first computer program to seriously court the favor of race car fans. The cartridge uses mock first-person perspective—racing simulations frequently employ an on-screen car as a sighting aid for players—to simulate racing dune buggies over the badlands.

The goal in TURBO, the most popular coin-op racing game at the time of the release of BAJA BUGGIES, is to drive as long as possible in order to marvel at the wide range of visual settings. On the other hand, competitive racing is definitely the main event in

BAJA BUGGIES. The screen always prominently shows the player's current standing, and, though the scenery is nice, one sand dune does resemble the next after a while.

POLE POSITION helped racing simulations take another big leap forward. It introduced the notion of trial heats before the actual race and offered players a selection of courses and distances.

The graphics in the home edition of POLE POSITION, though not as breathtaking as those on the Atari coin-op original, are still impressive. Unfortunately, the vehicles are blocky, which occasionally detracts from a player's ability to judge distances.

CONTINUED ON PAGE 73

DOS 3 to DOS 2.5

I was wondering if the new DOS 2.5 will have an "Access DOS 3" function to convert DOS 3 files to DOS 2.5 files.

Brad Jones
Sanford, ME

Yes, the DOS 2.5 master disk contains a utility program called COPY32.COM. This program copies DOS 3 disks to DOS 2.5 format, letting you use enhanced density without sacrificing DOS 2 compatibility.

80 Columns for Atariwriter

I use Atariwriter constantly and sure would like to be able to look at 80 columns, particularly when preparing tables, etc. What modifications or additions do I have to make to get an 80-column display?

Harvey K. Waters
Crete, IL

It isn't as easy as that. First, you need some hardware to generate an 80-column display. Batteries Included has announced such a card, and Atari plans a monitor that includes an 80-column card. Next, your software has to take advantage of the 80-column hardware. No software that we know of can do this—yet. Once the 80-column products hit the market, AtariWriter+ and Paperclip plan to support them. You will have to buy new versions of the software regardless.

Vector Graphics

I am very much interested in obtaining a special video monitor to use with my Atari computer system. I believe it is called a color vector scan. It is the same type used in several commercial video arcade game machines such as STAR TREK, TAC SCAN, and STAR WARS. I'm sure that a special interface would be required to make such a video display function as well as appropriate software. Please advise me where to turn for such peripherals even if they have to be custom made.

Sam K. Staber
Neosho, MO

There are two basic types of video monitors: raster monitors like your TV and vector monitors like the arcade games you mentioned. The only commercial attempt

that we're aware of to make vector monitors available to the home was the ill-fated Vectrex unit. Perhaps you could buy an arcade machine and find some electronics wizard to adapt it for you—but then you would need entirely customized software to make it work. It sounds to us like a lot of trouble and expense.

Games, Games, Games

The "old" Atari showcased several games at the 1984 June CES, namely CRYSTAL CASTLES, JR. PAC MAN, POLE POSITION II, etc. Are these games to be released or have they been shelved? I am asking because I recently picked up MILLIPEDE, TRACK & FIELD, and the fantastic FINAL LEGACY. Is there any connection between Atari Corp. and Atari Coin-Op? MARBLE MADNESS would make a great home game.

Brian S. Johnson
Chicago, IL

CRYSTAL CASTLES has made it out as an AtariSoft game and a 2600 game, but not for the Atari computers. The others aren't going to make it. Most companies have cut way back on game releases because sales have slowed down. Atari Games (the coin-op company) is a separate company—the rights for a computer version of MARBLE MADNESS were sold to Electronic Arts (we can't wait, either).



ST Interrupts & Software

I am planning to buy an Atari 520ST when they are released. There are still a few questions left unanswered. In your February issue you stated that the ST had 7 levels of interrupts. Does this include features such as display list and vertical blank interrupts? I have heard that GEM comes with built-in software ranging from games to education to business uses; what does this include? How do the larger software manufacturers, such as Broderbund, Electronic Arts, Synapse, etc., feel about the ST's? One more question: are there any books currently available that teach programming the ST's in machine language?

Erik Jambor
Birmingham, AL

The BIOS software in the ST does indeed support both raster interrupts and vertical blank. The 7 levels referred to in the article were the 68000 chip's interrupts, which are a bit different than the system's interrupt structure. So far there's only one ST book on the market we know of—from Abacus—and it doesn't go into any real depth on the ST system. Atari plans to publish a master reference book for the ST including all system documentation and hardware specs. Watch for it in the fall.

The software community is enthusiastic about the computer, although some companies want to wait until the computer is out before committing themselves all the way. We know of software from Electronic Arts, Spinnaker, Haba, Infocom, and of course AtariSoft.

Logo Notions

As a computer teacher at the elementary level your articles on Logo are very helpful and just the backup needed for teachers using Atari computers and Logo. I have used Atari and Apple Logo and wonder if list processing is possible using Atari to the extent it is on the Apple system? I can find very little information published for Atari Logo users. Joy McClintock
Uriah, CA

Atari Logo is just as capable as Apple Logo when it comes to list processing. For some reason (maybe Apple's position in schools) there are more books on their Logo than on ours. We hear that a new book called Logo Works: Great Programs in Atari Logo, will be published this fall. The book is written by many of the original designers of Atari Logo and contains quite a bit on list processing. You also should investigate the Waite Group's book on Apple Logo—it translates fairly easily to the Atari system.

Telecom Gripes

I have considered purchasing a modem for a long time. I purchased the Atari Teletink cartridge several months ago to get some idea of what it's all about. I have been doing some research and from what I found, I am pretty turned off by the whole thing! CompuServe, the Source, and others charge a rather steep fee to "join." I feel that this is a rip off—what is it for? Just to add your name into their files? Some charge a yearly fee of \$25, others have a monthly minimum of \$10, all of this in addition to the "off peak" charge of \$6.00 an hour to use the system. At 300 baud it is going to take lots of time to sign on, wander through all the menus to get wherever you want to go and finally get the information you want. If modem operation is anywhere as addictive as the computer, my service bill would be a million dollars per year! Who can afford that? Charles A. Mudre
Huntington, CT

It is our experience that telecomputing may be even more addictive than computing in general! We have reports of people spending literally thousands of dollars in a month. We also know of people who have romanced and gotten married as a result of online activities. There is a ray of hope on the cost front—prices have been steadily dropping, although not as quickly as the rest of the industry. The more people use these services the more economically they can be made available. The solution for now is not to turn your back on it—there is too much valuable material out there, especially in the Atari SIG on CompuServe, to let it go by. Just try some self-discipline and keep your accesses down to half an hour at a time and you should be OK.

XEM & XEP

I'd like to commend you on your magazine. I would like to see this magazine monthly rather than bimonthly. The gap in between issues can get filled up with a lot of questionable information from other sources which can be very confusing. It was annoying to find no mention of the 65XEM or 65XEP. They were in every other magazine I've read but the information was very confusing. One magazine said the XEP would have a B&W monitor, another said color, another said Atari had dropped the XEP period, and another said Atari was going with an ST version instead. James R. Deragon

We would like to publish the Atari Explorer more frequently, too—but until the market stabilizes (with all the new products being released) we will stay a bimonthly. The magazine is doing very well, though, so next year, who knows. The reason you didn't see anything on the XEM and XEP in the last issue was that it became apparent that those products weren't received as well last January at CES as the other products, especially the portable XE. There was interest in a portable ST which is not even designed, so someday there might be one. As for the XEM, don't write it off just yet. We have heard it operating and it sounds incredible.

Fix That Poke

In the February 1985 issue of Atari Explorer you printed a program that makes your programs unlistable. When I added it to my programs I got an error message. Then my brother (an

Atari whiz) pointed out that the line:

```
POKE PEEK(138 +  
256*PEEK(139) + 2,0  
should look like:
```

```
POKE PEEK(138 +  
256*PEEK(139) + 2,0
```

I still get an error message! Can you please straighten this out?

Barry Lancaster

Oops! The correct line is:

```
POKE PEEK(138 +  
256*PEEK(139) + 2),0
```

Remember that the number of open parens must be the same as the number of close parens. In your fix, you had 2 "opens" and only one "close," so it was a matter of finding the right place for another "close."

An ST Update, Please

I am looking forward to being able to acquire an Atari ST computer: truly "power without the price." I do have a few questions. The February issue of Atari Explorer said that the ST series of computers will have 192K of built-in ROM. A brochure that I received this past week says 16K of ROM. What's the story? The same brochure listed RGB and high-res monochrome as the video ports. Does that mean that as shipped the ST computers will not work on a TV? Harry E. Bolton
Metairie, LA

The latest word is that the 520ST will have 16K of ROM, just enough to boot up the system. TOS loads from disk. TOS in ROM will be available eventually—you will be able to take a current 520ST and get the ROM's put in by a service center or a dealer. The 520ST also has no video or TV output—but since the 520ST is being sold as a system you get a monitor when you buy the machine.

XDM Printer & XM148 Monitor

Although the stores have a supply of the 130XE, I cannot find anyone with the XDM printer or the XM148 monitor in stock. Could you please tell me when this hardware will be available?

John D'Ambrosio, Jr.
Fort Wayne, IN

The new printers and monitors will be out this summer—August is a fair bet. That's why you couldn't find them yet. Keep an eye on the stores where you saw the 130XE's. A

selected hardware and software, all members receive the JACG NEWSLETTER, a monthly publication that is crammed full of Atari news, rumors, product reviews and valuable programs.

Prolific JACG Members

The open forum that JACG presents for exchanging Atari related ideas and concepts has provided a fertile breeding ground for a number of its prolific members. Among JACG's nationally known writers and software authors are Dick Kushner and James Coan, co-authors of the book *Basic Atari Basic*. Dick is also a frequent contributor to the ATARI EXPLORER. Arthur Leyenberger has written for the ATARI EXPLORER and many other nationally distributed computer magazines, and is currently the East Coast Editor of *Analogue*. Donald Forbes, a FORTH expert, has written voluminously for the JACG NEWSLETTER and has been writing a FORTH column for *Analogue* for several months. Don Ursem has two software titles under his belt, *Starbase Hyperion* and *Tank Trap*, both published by Quality Software.

Informal Atmosphere

Arthur Leyenberger, JACG's current President, summed up his group's emphasis in a message he wrote to prospective members: "Although we currently have over 500 members, we try to remain informal and provide a comfortable forum for all Atari owners."

Vital Statistics

If you'd like to become a JACG member, receive your newsletter, and participate in their Software Exchange Program . . .

Write: Jersey Atari Computer Group, 40 Lawrence Road, Parsippany, New Jersey 07054

Call their hotline at 201-884-1642 for up-to-date club information, or, if you've got a modem, and would like to chat with the JACG BBS, call: 201-549-7591.

Two Programs from JACG BDIR

by Don A. Ursem

BDIR is a short program that creates a short (one sector) file on your disk, then allows you to scan the disk directory from BASIC while retaining your BASIC program listing!

BDIR is easy to use. RUN the program after you've entered and saved it. Then, when you want to see what's on your disk directory simply type:

E:"D:D" [RETURN]

The quotation marks surrounding the two D's are important

—make sure to type them in!

One word of caution. After you run BDIR, list your program and you'll notice that a line number 32767 has been added to its end. Delete this line by typing:

32767

and pressing RETURN before you save your program.

```

10 ? " BASIC DIRECTORY UTILITY"
20 ? ", by D.A. Ursem for JACG"
30 ?
50 ? "This program puts a file named '
D' on your disk. To view the directory
type:"
60 ?
70 ? " ERASE "
80 ? :? "It won't wipe out your Basic
program!"
90 ? "... FILE D BEING CREATED..."
100 DIM A$(300)
110 OPEN #1,0,0,"D:D"
120 FOR I=1 TO 4
130 READ A$
140 FOR J=1 TO LEN(A$)
150 K=ASC(A$(J))
160 IF K=43 THEN K=155
170 IF K=92 THEN K=34
180 IF K=47 THEN K=44
190 A$(J,J)=CHR$(K)
200 NEXT J
210 ? #1;A$;
220 NEXT I
230 CLOSE #1:END
240 DATA 32767POKE 201/10:CLR#
250 DATA CLOSE #1:T.32767:POKE 201/1
260 DATA :DIM F$(20):0.#1/6/0/\D:*. *
270 DATA :F.I=11064:I.#1/F$:?F$/:N.I+

```

DISKUTIL

by David Rosenstein

DISKUTIL is a fancy disk utility program that saves you lots of time by working directly from BASIC. After you run DISKUTIL you'll be presented with a numbered menu that allows you to delete files, format a disk, look at the directory, and in short perform most of the functions normally done by your Disk Operating System.

```

0 REM DISKUTIL
1 REM | Disk Utility 2.2 | IN UTIL
2 REM | | IV OF
3 REM | David Rosenstein | LIST
4 REM END
5 DIM FLN$(12),NFN$(12),FILE$(25),DR$(
3),B$(1)
10 GRAPHICS 0
15 ? :? "
"
20 ? " | DISK UTILITY VER. 2.2 16/11

```

CONTINUED ON PAGE 46

**WE DON'T BUILD
MOTOR VEHICLES.
IF WE DID,
IT WOULDN'T BE
A LITTLE, FOREIGN
TWO-SEATER.**

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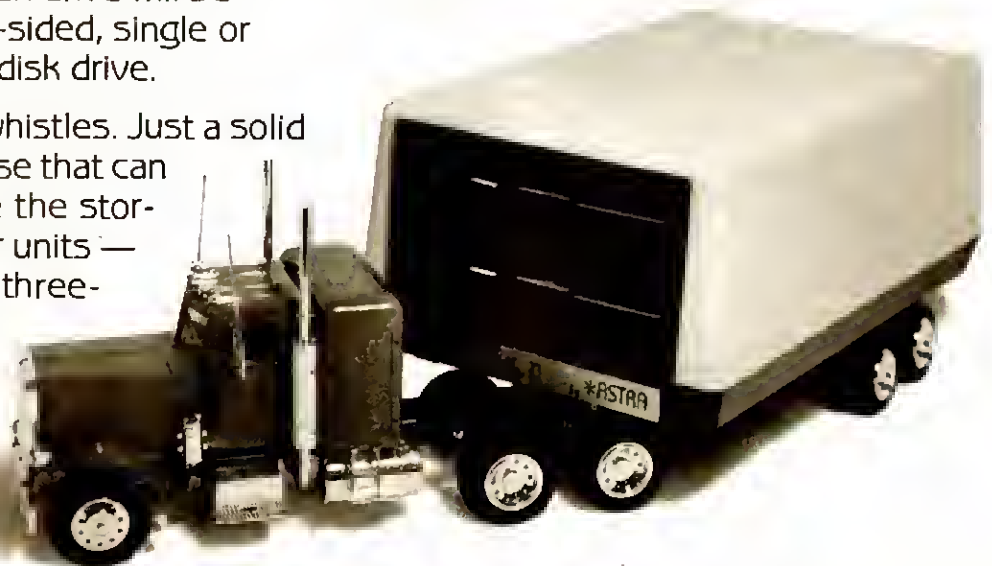
Software programs such as word processing, data base management, spread sheet analysis and mailing lists are made more powerful, and, at the same time, easier to use if you have two disk drives.

And it's compatible with Atari's new XE Series as well as the original and intermediate computers, 400, 800, 600XL, 800XL and 1200XL.

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Santa Ana, California 92704



How To Know What You're Watching

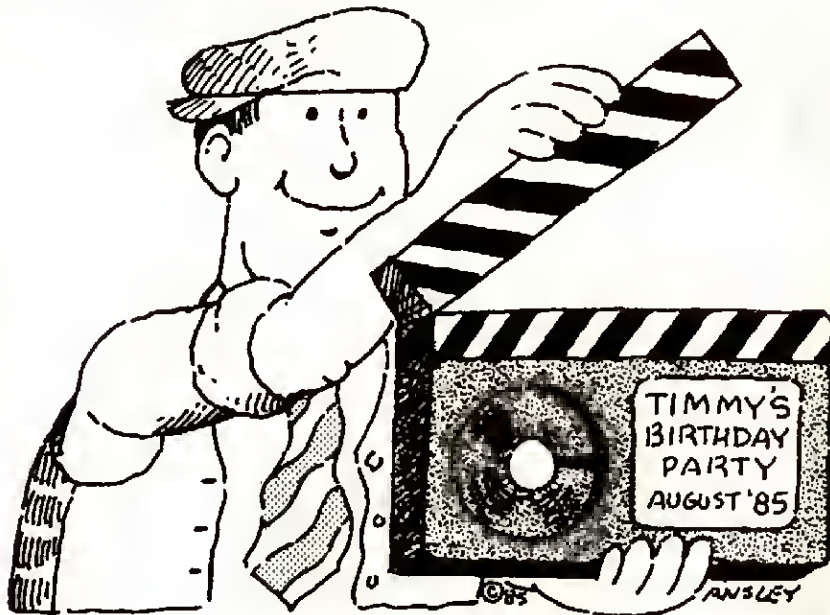
Video Titling Software Makes It Easy

Have you ever wished you could fix things so you knew what was coming up on your videotape without watching the first few seconds of a program? If you've been recording a lot of computer outputs, T.V. shows, and home movies, and are starting to get all of them mixed up, what you need is the services of a video titler.

A titler is a piece of software that allows you to format messages in large letters for display on the T.V., so you can record it on tape. With a video titler, you have easy control of what you display. You can play with a message until you like what you see, and then turn your VCR to a blank spot on your tape and record the message there. Voilà, a title screen or series of screens that announce what is coming up next. This is useful if you put the adult film festival on the same tape as your little Brother's Star Raiders tournament.

Video titlers come in varying levels of price and sophistication, as is illustrated by the two products reviewed below. Some titlers are very simple and oriented to home use. Others are quite versatile, allowing many screens and line-by-line color control and different text size options.

Video Title Editor by Videoware, in Southfield, MI, is a very simple, easy to use program. It is completely menu-driven, with 24 different messages to choose from. All you have to do is pick a message like "Birthday" "Home Movie—Credits" or "Custom Message," type in its number, and follow the prompts. You provide the information and pick the colors, and the Video Title Editor



does the rest. The program flashes one line of text at a time. As long as your needs fit in to the 24 categories provided, it's a fine program. There is no learning of commands and no extra typing of other than essential information.

If the user needed to display more than five lines of text, or wanted varying type sizes, they couldn't use *Video Titler*. They might be happy with *Video Billboard*, sold by Dynacomp, in Webster, NY. This program can display up to 20 screens of text, three letter sizes, control line color, and display 10 to 5 lines on each screen. This is a sophisticated program for sophisticated use. It is much more flexible than *Video Title Editor*. *Video Billboard* uses a custom character set and a specially modified DOS.

The user has a great deal of control over everything that goes on to his screen. The problem with this control is that the user must learn a whole set of control commands, or refer constantly to help menus, to use it. The

possible uses for the program make it worthwhile to consider learning the commands. The user can set up a series of screens to do anything like flashing schedules, series of notes, or menus. 180 screens can be displayed on disk and set up to run by themselves, be recorded on tape, or respond to the keyboard like a slide projector. This makes it ideal for business or professional use.

These two video titlers are not the only ones available. For instance, one called *Video Titler* is also available through Dynacomp, and there are probably others around. They all allow the user to take advantage of blank segments on their video tapes, and create title screens to end the confusion that can result from having more than one item recorded on a tape.

Video Title Editor is available for \$29.95 from Videoware, 19777 W. Twelve Mile Rd., Suite 180, Southfield, MI 48076.

Video Billboard is available for \$59.95 from Dynacomp, 1064 Gravel Rd., Webster, NY 14580



Irvine Green, 256BPE organizer of the 1984 Mmabatho Sun Amateur Radio DX-Expedition, hard at work at the Atari keyboard.

An XL Manages Data for Radio Hams

by Irvine Green,
reporting from South Africa

Amateur Radio is an international hobby which knows no bounds, of race, color, creed or religion, and it is precisely in this spirit that one country allows another to operate a radio station from within its borders.

Such an event occurred recently when a group of radio hams from South Africa set up a radio ham station at the MmBatho Sun Hotel in Bophutswana. There are few operative radio hams in Bophutswana and thus it is classified as a 'rare' country. The purpose of this radio ham DX-Expedition as it was called was to give radio hams overseas the opportunity to contact a rare country.

During the ten day operation an Atari 800XL home computer with disk drive and printer was used for keeping records of stations contacted (as required by law). However, by having this data on computer, information not previously available to the radio operators could now be extracted easily and quickly.

With the help of the Atari 800 XL—and the APX Data Management System—the radio operators could see how

many had been contacted on morse code or by voice, how many contacts were made on each frequency band, or how many countries had been contacted. The information available included a daily count of stations contacted, what frequency band was best for a certain time of day and how many had been contacted in each country.

"There were times when the computer worked flat out for 10 to 14 hours a day calculating, printing, recording, sorting and updating information. It was faster than some other computers we have used for a similar purpose in the past—and certainly outperformed most of them on a price/performance ratio," said Irvine Green, organizer of the event. "This was our fifth DX-Expedition for Sun International and they were most impressed with the data processing performance of what is usually termed a 'games' machines."

Eight hundred contacts in 66 countries were made during the event, some other rare countries among them—such as Gabon, Gambia, Andorra, Iceland, Hong Kong, Tanzania and Antarctica. —Irvine Green

Great Special Ed BBS

Here is one more thing your local special education administrator can offer you. Try asking about their access to SpecialNet, a database and E-mail service operated by the National Association of State Directors of Special Education.

SpecialNet is the largest education-oriented computer-based communication network in the United States. According to Linda Gibbs, the Director of Training for the SpecialNet project the net began with only 50 subscribers, the State Education Agencies. Now, the network has 2300 subscribers, each one of which usually represents an office.

The best feature of SpecialNet is the wide variety of bulletin boards on the system. There are presently 40 on some pretty interesting subjects for educators, administrators and parents of special children. Here are a few:

Federal—Information from Washington for administrators in special education: happenings in Congress, activities in key Congressional committees and the Office of Special Education.

Rural—A source of practices, programs, publications, and other resources for rural special education.

Litigation—Brief descriptions of court cases and hearing decisions.

One drawback to SpecialNet is the cost. SpecialNet is accessed through TeleNet, and connect time runs from \$4 an hour, at night and through a local number, to \$22 an hour during business hours using an 800 number. In addition, subscriptions cost \$200 a year. Subscribers include school districts state and federal offices, universities and individual subscribers. To find out more about SpecialNet, call or write:

SpecialNet
National Association of State Directors
of Special Education
2021 K Street, N.W. Suite 315
Washington, DC 20006
(202) 296-1800

NEWS CONTINUES ON FOLLOWING PAGE

Resources for Computer Teachers

There are many routes to professional growth in any field, and computer aided teaching is no exception. In addition to programs offered by the school districts in which they work, there are conferences, workshops, and magazines available to teachers. The resources listed below are a few of the ways computing teachers can enrich themselves.

Two Publications

Teachers who want to learn more about computers can learn a lot by reading *The Journal of Computers in Mathematics and Science Teaching*. It is a very interesting publication devoted exclusively to publishing articles on the use of computers in mathematics and science teaching at all levels. The *Journal*, published by the non-profit Association for Computers in Math and Science Teaching, is a professional quarterly publication for mathematics and science teachers interested in instructional uses of computers.

Articles feature descriptive uses of computers for mathematics and science instruction, tutorials on the use of computers for mathematics and science instruction, and research studies on teaching with computers. Regular columns include: Learning with LOGO, BASIC Tools, an annotated bibliography, and Conference Abstracts.

Another good publication is *The Computing Teacher*, published by the International Council for Computers in Education (ICCE). This organization is the parent group for professional societies of teachers across the country, and overseas, such as Computer Using Educators in California, and SCOPE in the Netherlands.

The Journal of Computers in Mathematics and Science Teaching is published quarterly. Subscriptions are \$18 for individuals and \$36 for libraries. Write to JCMST, P.O. Box 4455, Austin, TX 78765.

The Computing Teacher is published nine times a year, and is available from the International Council for Computers in Education, University of Oregon, 1787 Agate St., Eugene, Oregon, 97403-1923

... And Two Conferences

Another good way for teachers to learn about computers is to attend a conference on the subject. There is such a conference, called *Computers in Education* being held October 18-20 of this year in New York City. This event will feature exhibits and product demonstrations by manufacturers and publishers of computer hardware and software, geared to both school and home

use. Seminars will be held in conjunction with the three-day exhibit. For more information, call or write:

Carole Dornblaser
CMC, 17 Washington Street Norwalk, CT
06854, (203) 852-0500.

A more scholarly workshop will take place in June of 1986 and is still calling for papers. Called a "Workshop on Empirical Studies of Programmers" it will cover such topics as cognitive models of programming, documentation, teaching strategies, and assessing programmer abilities. The submission deadline for papers is November 1, 1985, and all submissions should be addressed to:

Elliot Soloway, Conference Chairman,
Dept. of Computer Science, Yale University,
New Haven, CT 06520.

Atari over the Airwaves

Radio rats, alert! There is a network for Atari hams. It is called the Atari Microcomputer Net Amateur Users' Group and is composed of ham radio operators who own Atari computers. It is run by Jack McKirgan II-WD8BNG, an enthusiast who publishes "Ad Astra" the group's journal. McKirgan estimates that 14,000 ham radio operators who own Ataris have contacted the net which has 800 members.

What ham radio hobbyists do is operate small low power broadcasts stations, usually out of their homes. One of the properties of short radio waves is that they bounce off the atmosphere. As they bounce, they go great distances. This makes it possible for a ham operator to talk to anyone around the world.

Ham radio operators form networks by agreeing to tune in to a specified frequency at specified times and talk. With the proper equipment, they can connect their computers to the radios and proceed almost as if they were on a phone line network. Interfaces are available for connecting the radio to the computer for data transfer. Cantronics—1202 East 23rd St., Lawrence, KS 66044—has a number of products with software that is Atari compatible.

According to McKirgan, the average ham radio for low-end operations

would cost about \$800 new. A lot of hams give away old units to new initiates, however.

Ham radio operators as a whole, not just Atari Users, are represented by the American Radio Relay League, Newington, CT 06111. About 300,000 amateurs in the U.S. belong to this group. The League holds contests in which its members set up various types of radios and try to make as many contacts with as many countries as they can.

McKirgan is enthusiastic about the other services that ham operators do, like bringing families together through phone patches to the airwaves. "There is a group of Americans at the South Pole that interface their radios with local operators in the U.S. Then the local operators call up the families of the guys at the South Pole and they can talk almost free of charge."

The Atari Microcomputer Net Amateur User's Group has meetings on the air for various geographical areas of interest:

The National net-meets Sunday at 1600 Universal Coordinated Time (Greenwich Time) at 14,325 Mhz.

International Net—meets alternating Thursdays, 2330 UTC at 21,400Mhz.

A Direct Line to Atari

On March 23, 1985, a small room in Atari corporate headquarters started to buzz with activity from all over the country. Taking as many as four calls at a time, four 800XLs and eight disk drives hummed away.

The Atari BBS was on line.

Early response to the BBS was very good. The first callers were modemaniacs who heard of the BBS through the Atari SIG (special interest group) on CompuServe. They were pleased with the concept of an Atari bulletin board.

Some interesting ideas have been put forward by BBS users already. Brian Young, a BBS enthusiast who calls himself "Brainwave," suggested an electronic conference on hardware and software tips.

David Duberman, the user group coordinator and the systems operator for the BBS, feels user group activities will be enhanced by the Atari BBS. Six new user's groups from various parts of the country were added to the database in its first two weeks of operations. In fact, users are a major reason for the establishment of the BBS. "It's a direct line to the users. They can call in at night and leave messages when the rates are cheaper and it doesn't interfere with their daytime activities," said David Duberman, the Atari user group coordinator.

Duberman is also the System Operator for the BBS. He is excited about distributing programming to users through the BBS. "The idea is to get out files that Atari owners need," he said. By the time you read this, the Atari BBS should have DOS 2.5, the users group listings, and the RAM disk program for the 130 XEs available for downloading.

A permanent software and peripheral system has not been settled on yet. The public domain AMIS system was the first software used to put up the BBS, but other programs are now under consideration. "We're constantly updating the system, looking for the best software and hardware to run on," Duberman said. **A**

The Atari BBS is waiting for your phone calls. The number is (408) 745-5308. If it keeps ringing, the line is busy.

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DISK INCLUDES: • Directory mover • VTDC scanner • Duplicate sector finder • Sector mover • Bad sector writer • Sector data display • Autocopy builder • Other useful programs.

This comprehensive book and disk package should not be confused with low quality imitations offered elsewhere.

BOOK II • DISK II: Advanced Software Protection. This all new sequel starts where the highly acclaimed Book I leaves off. Book II is the most up-to-date resource available for the Atari owner. Includes reviews and explanations of products such as 'The Happy Enhancement', 'The Impossible', 'The Scanner', 'The Chap', 'The Pill' and 'Super Pill', & many others!

BOOK II: Tells you specifically what they copy, what they won't, how they are used, and the details of how they work. Book II also includes such topics as: • Translating protected programs • Copying disks with more than 19 sectors/track. Includes the newest protection methods by companies like Synapse and Electronic Arts • Data encryption • Phreaking methods • Program worms • Logic bombs • Bank-select cartridges • Random access codes • New trends in software law • Sample BASIC • Assembler programs • On-line security • And much more.

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Scan & Analyzes ALL Atari programs. Works on disks stored on disk, cartridge or machine memory. Converts machine readable assembler to human readable BASIC. Changes a 4 B or 16K cartridge into a binary load file and source file that you can view & change using regular Atari assembler. Clearly shows protection techniques such as BAD SECTORS, BAD DATA, etc. No other program can do this!

THE Scanner

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- Changes a 4 B or 16K cartridge into a binary load file and source file that you can view & change using regular Atari assembler
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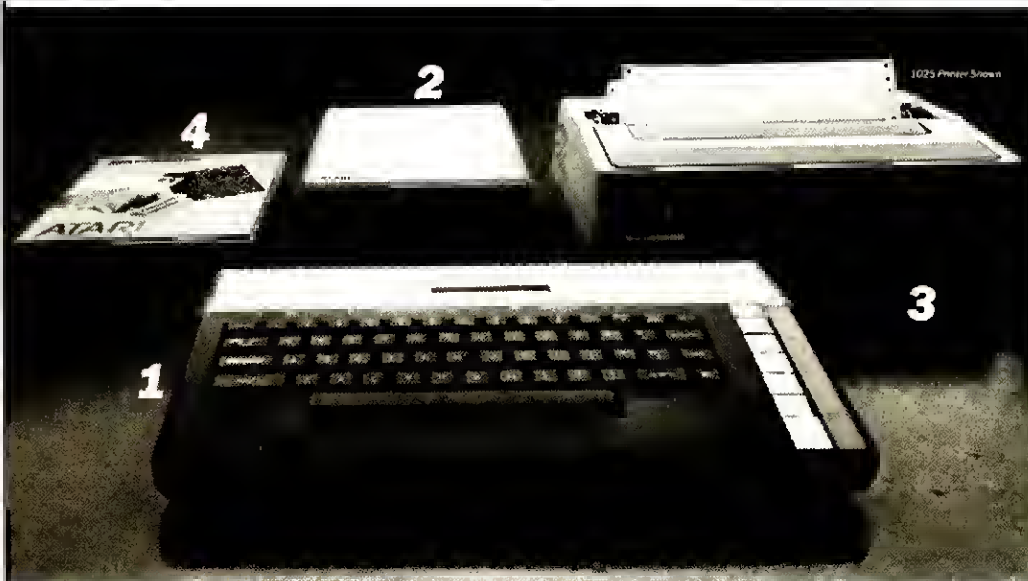
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*Denotes products not related to Alpha Systems.

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1 The Atari 800XL, the heart of the system. A world-class computer with the raw power and features of machines costing over a thousand dollars. With a 62 key, full stroke keyboard that has 4 special function keys, International character set and more. 64K RAM of dynamic memory makes it powerful and fast.

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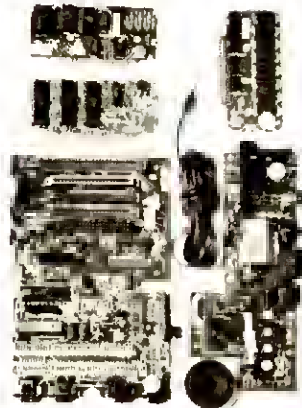
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POWER

De Re ATARI (All About ATARI) \$15, tells you everything you want to know about the ATARI 400 and ATARI 800 Home Computers, but were afraid to ask. It's an excellent resource and training text for professional programmers who use ATARI Home Computers and for advanced hobbyists who understand ATARI BASIC and assembly language. Neither an introductory manual nor a reference for the computer, De Re ATARI explains the concepts behind the internal structure of the ATARI Home Computer.

Topics include graphics indirection, player-missile graphics, display list interrupts, scrolling, sound, the Operating System, the Disk Operating System, ATARI BASIC and CTIA. Extensive appendices, sample programs, display screens, and diagrams generously illustrate the discussions. A glossary defines and explains some less commonly encountered terms.

An added feature is a laminated Programmer's Card containing the most needed facts and figures about the computer.

Replacement Printed Circuit Boards (PCB) w/parts
 800 Main \$25 400 Main \$20 810 side \$50
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 On 800/400 Main: Pokey, 6520 PIA
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Chicago, Chicago, It's a Wonderful Town

Atari at Summer CES

by Jeff W. Williams

Atari Corporation said it wasn't going to exhibit at the 1985 Summer Consumer Electronics Show held in Chicago during the first week of June. Instead, they would take alternate accommodations within the city where they would show their line and meet with distributors, retailers, and software developers. A few weeks prior to the show, Atari decided to appear at the CES after all, in a much more modest setting than one might have expected. According to company sources, all decisions hinged on economics and the benefits of attending. Jack Tramiel commented on this in an interview. "It was too expensive to bring our booth . . . It would have cost about \$500,000 and I felt it wasn't worth it to spend that kind of money, that I could attract the same people to visit someplace else in Chicago during that time . . . When we were offered the present space, we took it because it cost much less and we had 2 new consumer oriented products to show," he said.

Atari exhibited their product line in a set of meeting rooms on the mezzanine of McCormick West, the building that housed the computer, software, game, and video programming exhibitors. The exhibit featured the current eight-bit computers and software, including the 130XE and some new products will make use of the 128K RAM on this machine, and the new sixteen-bit machines, the 520ST system and the 260ST-FM. An adjacent room contained offices where Atari management met with distributors, software developers, press, etc. in private.



Atari chairman talking to end user



The 260 ST FM

Atari contacted the Chicagoland Atari Users Group (CL.A.U.G.) prior to the show to ask for volunteers to help them with their exhibit at CES. The CL.A.U.G. volunteers demonstrated hardware and software products to visitors and fielded many of their questions. Prior to the show, they helped unpack and set up the display systems and software. After the show they helped take it all down and packed it up again. CL.A.U.G. members got to work with the new ST computers, new software for the eight-bit line. They also got to meet Atari personnel (from Jack Tramiel on down), as well as many folks who write and publish Atari software and magazines. In addition, Atari gave CL.A.U.G. a 520ST color system and software to run on it, for their participation.

The ST Family Grows

The new model in the 16-bit line is called the 260 ST-FM. It has 256 Kbytes of memory, a built-in disk drive and operating system, plus a built-in modulator that will allow you to connect to a T.V. and operate in low and medium resolution modes. The 260 ST-FM can also be connected to an Atari monochrome monitor and operate in high-res mode. All features are identical to the 520 ST except for the memory, and the case is two inches deeper, to accommodate the disk drive.

What is striking about the 260ST-FM is its convenience. The built in drive and power supply mean that there is a total of 3 boxes less to scatter around, trip over, and generally clutter up the workspace. No more worrying about cords and plugs for the disk drive, disk drive power supply, and computer power supply. The 260ST-FM will be released in the fall.

Something Really New— The CD ROM

Another big draw at the Atari rooms was *Facts and Figures*, exhibited jointly by Atari and Activenture, of Monterey, CA. *Facts and Figures* is software that runs on the 520 ST and retrieves information off of a CD ROM. A CD is a compact digital disk that is read with a laser. A CD ROM is just like the CDs now being sold in record stores with music on them. There is one difference—instead of storing music, the CD ROM stores huge—450 megabytes



The CD ROM

huge—quantities of digital information. For the demo, Activenture put an entire encyclopedia on the CD ROM, with an exhaustive index. And that only took up 20% of the CD's capacity.

In the demonstrations conducted by Thomas Rolander, Vice President—Engineering of Activenture and Leonard Tramiel, Vice President of Software for Atari, *Facts and Figures* was used to retrieve information on any word or combination of words the audience requested. Such searches took the ST, using Activenture software, about 15 seconds.

"This is a revolutionary product," said Eliot King, a senior editor for *Computer Dealer* magazine who saw the demonstration. "This is a real reason to buy a computer." The CD ROMs cannot be read without a CD reader, however, and that is where the nature of the deal between Activenture and Atari is based. CD ROMs, compact digital disks that hold information, cannot be read by the same readers that play music. CD ROM readers with interface electronics are available now from Hitachi, Phillips, and Sony, but cost from \$1700 to \$2300. Atari intends to produce a CD ROM reader with interface electronics that will sell for a retail price of approximately \$600. According to Rolander, this is why Activenture developed *Facts and Figures* for the Atari ST first. "We get just a small piece of the action, the royalty on the program," he said. "We're not going to make a lot of money with a system that has a \$4000 price point. We'll do a lot better writing for a system that has a \$1000 price point," he said. Rolander cited the Tramiel's buying expertise as one of the reasons Activenture has joined forces with Atari.

"Nobody can deliver a pound of computer for less than Jack and Sam."

New Products for the 8-Bit Ataris

After a period of little new software availability, it looks like the dry spell is starting to go away. Many new products for the Atari were shown at this Summer CES. Here are some of them.

From Atari are some July releases, all for under \$50. *AtariWriter Plus* features a built-in printer driver editor (so you can take advantage of the features of non-Atari printers), spelling checker, mailmerge data base, up to 3 files in memory at once, and double column printing as well as many other pluses. All your existing *AtariWriter* files are compatible and you don't have to learn anything new to use the features that are currently available in *AtariWriter*. *AW Plus* comes on a two-sided disk, one side for 48K and 64K systems and the other side for the 128K 130XE.

Silent Butler is a home financial management package that tracks your income and expenses as well as important dates like birthdays and anniversaries. It will even print out your checks for you with the help of a plastic checkholder that works with most printers.

Atari Planetarium will chart the night sky for you from any terrestrial location for almost any date in time. Use this one to track Halley's Comet next year! Coming this Christmas, will be *VIP Professional*, a spreadsheet program that uses a mouse and pull-down menus. The mouse will be included with the software package.

Most exciting for me is the new XM301 modem with accompanying XE-TERM software on disk. This modem is barely larger than a pack of cigarettes and features 300 baud, auto-dial, autoanswer, pulse and tone dialing, and upload/download with or without X-modem protocol. All this for under \$50! I am afraid that so many people will scarf these things up that I will never get into my favorite BBS's again!

Batteries Included has already shipped *PaperClip* for the Atari. The current version will run on a 48K system. Later this year, a version that

makes full use of the 130XE's 128K should be released. When it comes out, the new release will be available for \$10 and your original disk. Also from B.I., the 80 column cartridge for the XL and XE line. Available in October, the B.I. 80 column cartridge allows true 80 columns on a monitor. A cable runs from the side of the cartridge to the video input of your monitor. Batteries Included says a new revision of *HomePak* will be forthcoming soon that will enhance some of the existing features and to take advantage of 130XE's memory size.

Two new games will be coming from Lucasfilms Games via Epyx this September. *KORONIS RIFT* and *THE EIDOLON* are sure to become hits. Both games feature the same quality and originality of *BALLBLAZER* and *RESCUE ON FRACTALUS*.

First Star Software has three titles coming out this fall. *BOULDER DASH II*, *SPY VS. SPY II*, and *SUPERMAN, THE GAME*. I had the opportunity to speak briefly with Fernando Herrera, founder of First Star. I told him that I used to be a big Superman fan and I am eager to see his game. It turns out that Mr. Herrera is very excited about it as well. . . he is a long-time fan too!

Muse Software has a new educational game geared to 4 to 8 year olds called *LEAPS AND BOUNDS*. This game helps teach letter and number recognition and provides an entertaining introduction to artistic potential and music appreciation.

Soniture has a new product called the *Space Pen* that replaces a touch tablet or joystick with many existing pieces of software and lets you draw or direct on screen action by waving it in mid-air! With special software from Soniture or that you can write yourself, you can actually control an on screen object in 3 dimensions.

Telesys has two printer interfaces for all Atari computers. *Turboprint/A* and *Turboprint/GTA*. Both interfaces allow English translations of control characters in program listings, as well as printing in inverse, in short, it will print your listing on paper exactly as it appears on screen. In addition, *Turboprint/GTA* is buffer expandable, allowing the addition of a 16K or 32K buffer.

ICD, Inc. has a new version of *Sparta-Dos* which will be shipped with their



Atari chairman



End User

You Never Know Who You're Going to Meet

Many were the times when I would be answering someone's question and glancing at the person's name tag I would find I was talking to someone like Michael Riechmann or Martin of Batteries Included. Russ Wetmore (Preppie!, Home-Pak), Fernando Herrera (First Star Software), and many more.

—J.W.W.

U.S. Doubler, the two chip replacements for the Atari 1050 disk drives that allow true double density. The original *SpartaDos* was totally incompatible with Atari DOS versions and was strictly command driven. The new *SpartaDos* is packaged as a *DOS Construction Set*. This allows you to configure the DOS any way you wish. You can use a menu or commands. It will sense the disk's format (*SpartaDos* or Atari DOS) and read and write files accordingly.

Activision has a healthy lineup coming for Atari. They include *HACKER*, *GARRY KITCHEN'S GAMEMAKER*, *THE COMPUTER GAME DESIGN KIT*, *THE GREAT AMERICAN CROSS-COUNTRY ROAD RACE*, *MINDSHADOW*, *THE MUSIC STUDIO*, and *MASTER OF THE LAMPS*.

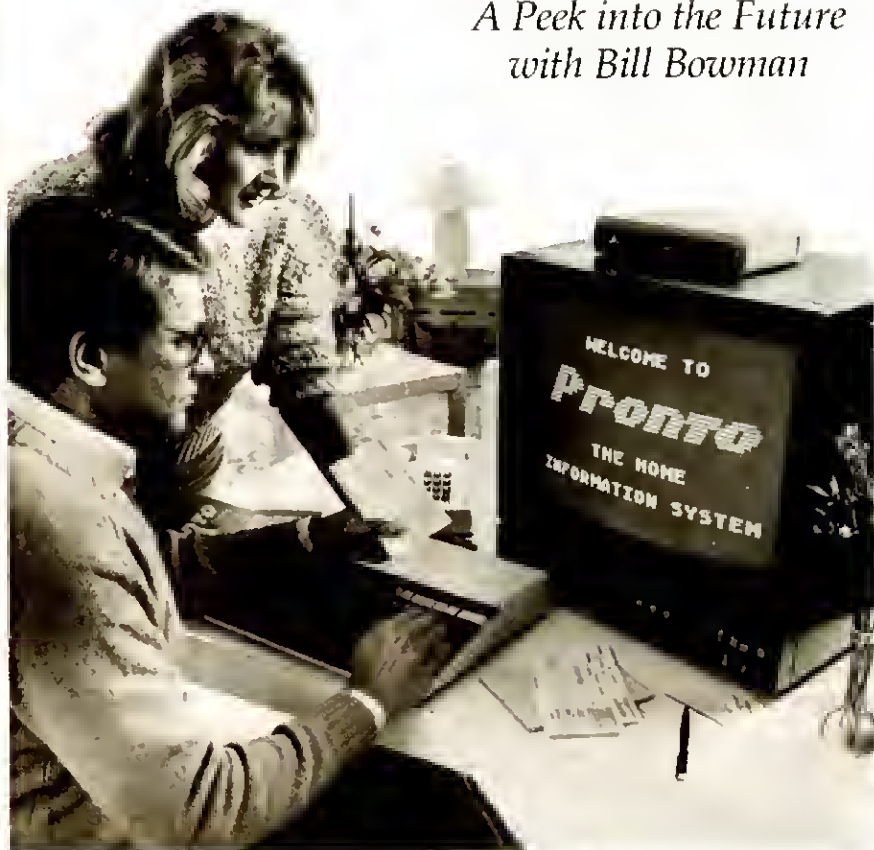
DataSoft will release in the fall the long awaited *Alternate Reality: The City*. I saw it demonstrated on an Atari system and it looked fantastic. Also coming from DataSoft is a game based on the movie *The Goonies* and a *Zorro* game.

MicoBits Peripheral Products have two telecommunications products in the works for Atari. One is *MPP BBS*, a bulletin board system designed to run on virtually any modem supporting multiple user levels and message bases. All system messages and files (like caller files, etc.) are contained in memory with a 130XE system and any single or combination of functions can be allowed or restricted to any user. *Omega Terminal* is an icon/joystick driven terminal program also designed to run on virtually any modem. All functions are controlled by moving the cursor with the joystick over the graphic icons and selecting with the joystick button. Windows appear with functions that are highlighted and selected by the joystick. The keyboard is only necessary to enter the file name for a download and for communicating with the service you are online with. Neither system is complete yet so availability is unknown.

Computer Magic has a product called *RobotLink* which allows you to create programs on your Atari computer that will program actions for a *Tomy Omnibot*, *Omnibot 2000*, or *Verbot*.

What's Up Ahead?

*A Peek into the Future
with Bill Bowman*



Bills, balances, fund transfers—all done at home on your Atari.

To make the home computer a household appliance, the industry must be able to answer "yes" to the skeptical public's question: "Will it save me time? Will it save me money?"

With the advent of the Atari ST, we are on the verge of a new home computer market. The new home computer market will be characterized by very powerful machines that are easier to use. Now, the interface between user and computer is not very easy. Typing esoteric "load" commands to get a program off the disk can be too big an ob-

stacle for a parent who buys a copy of *facemaker* for their four-year old child. A keyboard-oriented interface is as strange to most adults as it is to a four-year-old.

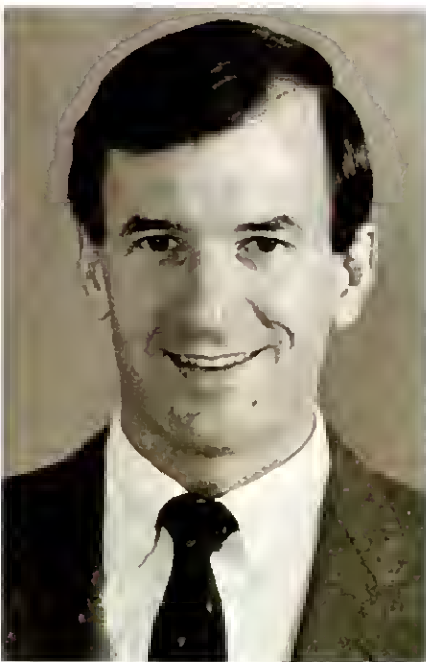
But on the Atari ST it will be very different. Turn on the computer, click on the mouse, and voilà! the four-year-old is off and running. Black-on-white, high resolutions, and mice. Now we're talking about an interface that can appeal to the mass market. The interface is right, the power is there, and the price is low. This combination will permit software developers to provide

product that will indeed "save time, or save me money."

Many of the applications will be communications-oriented. In our house, paying the bills is a real hassle. My wife has taken over the chore by default, but hates it. As a result, we incur finance charges each month. A future scenario might look like this:

My wife approaches the Atari ST in the corner of the family room, and the electric eye senses her approach and turns on the computer. The customized menu appears, and she clicks the mouse with the cursor at "PAY BILLS." The computer dials the bank, automatically downloads all the bills that have been sent to the bank instead of to us, and disconnects the line. The communications link is one of the most expensive parts of the transaction, so keeping the line free is very important. Now operating locally, she clicks the mouse at "AMERICAN EXPRESS." The line items appear, she looks them over, and clicks "OK" which will tell the bank to pay the bill on the last possible day before a finance charge. She then goes on to "BOSTON GAS" and so on until finished. No opening bills, verifying numbers, writing checks, licking envelopes and stamps, and relying on her husband to mail the bills. The time is cut in half, and no finance charges. We have "saved her time, saved her money."

And we've saved the bank money.



Bill Bowman, Chairman of Spinnaker Software.

Once banks, insurance companies, phone companies, etc. observe that 20% or 25% of the population have home computers, they will begin to subsidize the electronic delivery of their services, and penalty-price the physical delivery. Once your bank statements cost \$10 and your local phone company is charging \$25 for a telephone directory, even the anti-technologist will see it's in his or her interest to purchase a home computer. Spending \$199 for a home computer will make sense when one can forego \$200 per year in charges for bank statements, phone books, and American Express bills.

We are passing from one age to another. The "early adopters" have bought eight-bit machines and have had fun playing with them. Now we have to convince the other 90% that we have something that will save them time or money. Computers like the Atari ST permit software developers to build products that will answer those needs. ▲

The future of computing is almost like the weather. Everyone talks about it, but fortunately, some people do some things about it. Certain people like Bill Bowman. He is the president of Spinnaker Software, and a visionary. One of the things he is good at is imagining where the home computer will help people in their daily lives, and fitting it into their routines. —P. R. Adler

Home Banking for Atari Users

by P.R. Adler

Bill's wife (see "What's up Ahead?" facing page) may want to wait for her ST, but thousands of people are using Atari computers to do their banking and pay their bills right now. Rudimentary home banking began in 1978 with Prestel, a videotex system operated by the British Post Office for use with dedicated terminals. In the U.S., the first home computer ever to be part of a home banking service was the Atari 400, installed in consumer's homes by Chemical Bank in 1982 for their Pronto system.

There are approximately 44,000 U.S. home banking customers, most of whom use Pronto or Bank of America's HomeBanking program. According to TeleServices Report, a newsletter that covers home banking, more than 65 banks using 25 systems have installed personal access accounts. Some banks operate units that communicate directly with their customers, others work through networks like Comuserve or The Source. Essentially all home banking services are alike in that a user can dial his or her bank using a modem and a computer, and check balances, transfer funds, and schedule payments of bills anywhere in a 30 or 90 day period, depending on the bank. Most banks charge use fees for their services, which differ from bank to bank. According to Richard Forbes, marketing V.P. of Pronto U.S.A. Corp., the banks may one day begin charging for physical delivery of bills, but does not expect it to be soon. "Banking habits take a long time to change," he said.

The problem with the adoption of home banking, according to Forbes, is the fact that it is so new. There is a nat-

ural resistance to change which the industry must overcome. "When you talk to people about doing banking over computer, you're talking about a long evolution," he said. Other authorities point to problems of introduction, feeling that for home banking services, technology should not be pushed, rather the services should be introduced at a "very basic level." As Bill Bowman says, the consumer has to be shown how a home banking system will save him time or money.

If computers get easier to use, home banking will grow. An AMERICAN BANKER poll found that two-thirds of all computer users would consider using the machines to bank at home. Teletel, a videotex service in France, expects the number of its home banking subscribers to grow dramatically as the number of homes with Teletel terminals reaches a projected three million by the end of 1986.

Most computers available today do not have the ease of use of the Atari ST. But, as millions of people know, they are still extremely useful. And home banking is available all over the country. ▲

Here are the names and main locations of some major banks who offer home banking services:

Bank of America—San Francisco
Citibank—New York
Manufacturers Hanover—New York
Chemical Bank—New York
Manufacturers National Bank—
Detroit
Florida National Bank—Jacksonville
Banker Trust of South Carolina—
Columbia, SC
Worthen Bank—Little Rock, AK

—P. R. Adler

REAL PEOPLE USING THEIR ATARI

*Sherlock Bones Meets His Electronic Watson:
The Atari Personal Computer*

By Dorothy Heller

Meet Sherlock Bones

The business of pet detection usually involves ordinary pets who inadvertently stray or get lost. How does Sherlock Bones find them? He no longer pounds the pavement, unless a pet owner specifically requests his personal foot-work. In nine years of pet detection, he has developed techniques that enable pet-owners to carry out effective searches. His methods include a consultation, professional-quality posters, and using his Atari 800XL computer to generate up-to-date mailing lists of all the relevant animal hospitals, shelters, and vets in the area.

The wheels in John Keane's head started spinning when he spotted an ad in a newspaper offering \$1,000 for the return of a lost Chihuahua. While meditating in a health club sauna, the total "Sherlock Bones" concept popped into his head. "I'll find lost or stolen pets and reunite them with their owners!" John didn't waste any time taking on this new challenge. He sold his sports car to raise the needed capital, quit his job, and marched bravely (if naively) into the pet detective business.

"Sherlock Bones" was born in 1976. John Keane was then a successful insurance salesman with a houseboat in the Oakland Marina, a 260Z sports car, membership in an expensive health club, and wall-to-wall carpeting. But



Sherlock Bones

something was missing. "I got tired of talking to my clients about their impending demise," he recalls. "I wanted a way to earn a living that was emotionally as well as financially rewarding."

Reflecting back on the "good old days," John says, "I never imagined that the business would grow and develop the way it has . . . there's never a dull moment.

"At first I made all the mistakes that anyone breaking new ground does. I wasn't finding many lost pets, wasn't making a profit, and on a number of occasions, almost gave up the whole idea. But I stuck with it. I was doing something worthwhile and felt good when I was able to reunite a distraught owner with his missing pet."

On the Job with Sherlock Bones

In addition to local dog and cat finding, Keane's cases have included a lost llama, a parrot that flew the coop, and a kidnapped tortoise. His clients have called for his services from Denver, Boston, Washington DC, and Hawaii.

In one of his more exciting cases, Sherlock discovered that a missing doberman had been petnapped and given to a local drug dealer as payment on a gambling debt. When he approached the drug dealer's house, he spotted the dog locked up in the yard, guarded by a mean-looking, beer-drinking man, who was sitting on the

front stoop. It was the drug dealer himself!

"The dog's owner really loved that doberman, and I was committed to rescuing it. But, how was I going to get this animal back? This could be dangerous!"

Keane devised a fast and effective strategy to recover the doberman. Keane had an assistant telephone the dealer while he waited near the house. "The instant he got up to answer the phone, I backed my van into his driveway, cut the lock on his gate, and recovered the dog. I was gone in two minutes. . . . to my relief!"

Although most cases are not so exotic, Sherlock's consulting services can often mean life or death for the missing pet. In one recent case, he was called in by a Los Angeles attorney who hadn't been able to find her lost dog in any of the local animal shelters or veterinary hospitals. "Two little girls saw the Sherlock Bones posters in the neighborhood shopping center and went looking for the dog. They found the poor pooch in the bushes, where he had crawled after being hit by a car. He was dying of exposure. We found him just in time!"

Keane reveals some of his methods in his paperback book *Sherlock Bones* (usually found in the mystery section of your local bookstore).

Sherlock Bones Meets His Electronic Watson

Keane introduced a new ingredient into his business last year—an Atari 800 XL personal computer. He immediately discovered that the Atari computer, combined with *AtariWriter* and *Mail-List*, made a dramatic difference in the effectiveness and scope of his operation.

"First of all, I'm basically a very messy person. I always joked about knowing where everything was in the mess on my desk. In reality, I wasted valuable time and energy by not being organized. The Atari forced me to get organized. It's like working out of a box. When I'm finished everything has to go back into that box. Now I know that all my important information is on a disk, and I know exactly where to find it. Since I'm really in the information business, this is very important to me."

Keane started using *AtariWriter* to keep a daily log of telephone calls. "This seems like a very simple application, but an accurate telephone log

means a lot to someone like me who does much of his work by phone."

As soon as Keane receives a call, he logs it in. He then updates the log as he responds and follows up. "The printout gives me an accurate record of each day's business. When I'm out in the field, I carry an updated printout that lists who I need to call and what action needs to be taken. This system sure beats phone messages scribbled on the back of envelopes!"

Keane uses his Atari computer to store and retrieve information essential for an effective pet search. "It's actually not that easy to compile an up-to-date list of the animal shelters, pet hospitals, and other relevant organizations in your area; especially when your pet is missing and you're emotionally distraught." With the help of his Atari, Keane keeps track of all the organizations that need to be contacted immediately during a pet search. "The mailing list program is invaluable for getting the word out quickly, updating my records, sending courtesy notices to local vets and animal hospitals, and distributing public relations material."

Keane is also using a data base to nab petnappers who sell lost or stolen animals. "Using the Atari helps me keep track of newspaper advertisements and sort out the legitimate breeders from petnappers."

Word processing with *AtariWriter* and the *Atari Proofreader* has delivered some unexpected benefits and opened up new vistas for the petfinding business. "I wasn't really aware of it before, but I really avoided writing letters," says Keane. "I wasn't confident about my spelling and grammar. Making obvious spelling and grammatical mistakes in business letters is very embarrassing and deadly for public relations."

By using the word processor and proofreader spelling checker, Keane learned how to type, then discovered that his writing skills were improving dramatically. "Some people say that using a word processor with a spelling checker in schools is a crutch. Nothing could be further from the truth. By running my letters through a spelling checker, I discover my mistakes and learn the correct spelling. My grammar has also improved because it's so easy to edit, rewrite, and restructure sentences."

Keane found that he was developing solid confidence in his writing as well

as saving valuable time. "I had previously written a book, but it was a real struggle to do everything in longhand!" His newfound confidence opened up new horizons for him in public relations and business communications.

"When I bought my first box of printer paper, I thought to myself that never, in a hundred years, would I ever use so much! I use reams of it, and now I find myself using my Atari and printer every day.

"It's a good feeling to be shaving in the morning and hear my printer humming away; working for me before I've even had my first cup of coffee!"

Keane takes his computer on the road and on vacations. "One of the neat things about the Atari system is that it's so lightweight. I put my computer and disk drives in my knapsack, and the printer in a tote bag. I'm in business anywhere I go."

Even on vacation, Keane begins the day by "limbering up on the Atari's keyboard. I don't feel like the computer is an intrusion; it's fun and stimulating to begin the day by doing some writing. "The Atari is literally my electronic Watson. . . . it chronicles all my activities and adventures."

Calling All Petfinders

Keane's newfound confidence in his writing and organizational skills paid off in an unexpected dividend. While meditating, he came to the realization that it was time to share his expertise by teaching other people how to run a petfinding business. "After nine years of experience, I know more about petfinding than anyone in the world. I know that there are people all over the country who need this information. Although I've personally located pets all over the United States, petfinding is a personalized business that is best performed in your own community by someone who knows your area."

Keane decided to write a complete manual, combined with an instructional videotape, that covers the petfinding business "from A to Z."

Keane's manual includes more than techniques for pet detection; he also explains all the aspects of running the business. "I'm assuming that novice petfinders don't know anything about running a business. I cover accounting, organization, public relations, how to get yourself accepted in the community

CONTINUED ON PAGE 48

Learning Software with Your Children

On Parent Involvement in Computer Assisted Education

by Joe Elcano

When you buy an educational program for your child, do you pat yourself on the back, load the computer, and let your child do the rest? Do you know what the program intends to teach your child? Do you know if your child is learning the objectives of the program? Is she or he using the program to its full potential?

These are all questions that you must answer. Your responsibilities do not end with purchasing a program. You must monitor what your child is doing and help him reach his full potential. To do this you must take an active part in the educational process. This starts by choosing the programs you buy carefully. Do not judge them by the beautiful art on the cover or the promises on the back. Read educational articles in computer magazines, talk to your child's teacher, or ask your local user's group.

Before you sit your child down at the computer, test the program yourself. One night after she has gone to bed, take out the program and do some research. Read the instructions and note the goals (if any are stated) and the subject. Then load the program and try it. Put yourself in your child's place. Is it interesting? Are the instructions clear enough? Get a feel for the program. When your child sits down in front of the computer, you will be able to answer her questions and complement the program with your own ideas.

How can you augment the educational program? Perhaps the best way to explain is with an example. The Feb-



ruary 1985 issue of the *Atari Explorer* presented a public domain program called "Alphabet Train," an excellent program. It teaches the relationship of the letters of the alphabet, and has good graphics and sound. But with just a little help from you it could do much more. Find a coloring book or a book on trains. Get a picture of a small flatcar and trace it 26 times on white paper. Then add the letters of the alphabet (like they are written on the train) to the top of the flatcars. Put them on a piece of cardboard and put them above the computer when your child plays the "Alphabet Train." Now he can see the entire alphabet at one time and the relationship of all the letters. Get another coloring book with a picture of a truck on it and have many copies made at a local copying center. Each time your child comes to a new word have him write it on the truck and color

it in. (You can write it in for him if he is too young.) Put these on the wall of his bedroom. Now you have turned the program into a reading program. If your child is doing all this work, a reward should be waiting for him. Every time he finishes 10 (or 5 or 20) words, he deserves something special. It can be as simple as a certificate. Young children can keep track of their progress by putting stars on the certificate. When they fill the certificate with stars it can be put in a place of honor.

All this is fine, but if you don't follow through it will turn out to be wasted time. If you write the words on trucks, review them once in a while. Talk to your child about them when you are in her room. If you make up an alphabet train, take it out once in a while and ask your child to find certain letters. Help her realize that an *E* is at the beginning of the alphabet and that a *T* comes much later. Make the certificate (or whatever reward you use) special. Praise the child for what she has accomplished.

Your child may not be as excited about the program as you hope, but don't let it be put by the wayside for PACMAN. There is nothing wrong with making him do some educational programs if you feel they are important, but it is easier to make him want to do them. Use your imagination to lead him to his full educational potential. It is your responsibility. **A**

Joe Elcano is a fifth-grade teacher from Sparks, NV. He gives computer classes to teachers.



TINK

TINK TONK

by Ute Elisabeth Van Nuys

Tinks Adventure

It's not unusual to find well-known characters from books and TV migrating to the computer screen. What is unusual is to find programs that bridge this distance well.

Authors and designers, however successfully they've conquered other media, must understand that computers are a uniquely interactive medium. With books and with TV, the flow of communication is one way, but the computer audience expects a higher degree of involvement. It's not enough to provide charming characters and hope that they'll carry the burden of interest and motivation. Good programs actively challenge and involve the user and the Tink! Tonk! series from Mindscape, based on Mercer Mayer's delightful story book characters, is an exciting example of this genre at its best.

TINK'S ADVENTURE is an electronic treasure hunt, a challenging learning activity, and an interactive game all rolled into one. Designed for youngsters from ages four to eight, TINK'S ADVENTURE does require reading. All the instructions appear on screen as part of a continuous storyline. The story branches out in numerous places to incorporate learning games and other activities. Choices abound. Children are asked, for example, if they want Tink to pilot a helicopter or a boat. If they choose the helicopter, they can choose to play a helicopter learning game or continue flying over a blue sea to some palm-studded islands. If they opt for the islands, they are

asked if they would like to land on an island or keep on flying. A coconut-lobbing gorilla inhabits the island and mysterious footprints eventually lead the young adventurer to a cave where treasure is hidden.

TINK'S ADVENTURE offers seven educational games designed to familiarize children with the computer keyboard and with the alphabetic sequence. The games are multileveled and older children enjoy them very much. Preschoolers can tackle easier levels of the keyboard games, but they'll need quite a bit of help from parents when playing games requiring letters to be placed in alphabetic order. In any event, parents should be prepared to join preschoolers when playing TINK'S ADVENTURE. This is a wonderful program, and there's much to be gained from it, but parents who are still hesitant should know that this program was extensively tested with children from ages four to six. The response was tremendous. Kids loved it and they couldn't seem to get enough of it.

Tuk Goes to Town

TUK GOES TO TOWN is another interactive story in the TINK! TONK! series. Multileveled learning games are woven into an on-screen story line, though the focus here is on spelling and visual discrimination. Beautiful graphics, animation, and sound add to the appeal and a number of nice touches such as a traffic light that turns red and green, causing Tuk to stop and wait or cross a street, make TUK GOES

TO TOWN enjoyable for children and parents alike. Because reading and spelling skills are emphasized, this program seems a little too difficult for preschoolers, but older children (six and up) can have a lot of fun with it.

Tonk in the Land of Buddy-bots

TONK IN THE LAND OF BUDDY-BOTS is a highly interactive, highly entertaining piece of software. Children are asked to find pieces of a BUDDY-BOT scattered over an extensive area. There are caves to explore, a cable-car to ride, soldiers to elude, and much, much more. There's even a map for older children, to help them find their way through BUDDY-BOT land with greater ease. Children have to think and react quickly to master this game and parents will enjoy having a go at it themselves. This is a novel approach to early learning games and one that makes good use of the computer's capabilities.

In testing the program with youngsters from four to eleven, I found that children were totally captivated by this playing format. Again, because the activities are multileveled, the youngest children are somewhat limited in what they can do, but that didn't deter our testers. Even the youngest children were extremely enthusiastic. They loved TONK IN THE LAND OF BUDDY-BOTS and practically had to be forced away from the computer when the testing was over. ▲

*Designed by Mercer Mayer, Developed by
Anglesoft, Inc. Mindscape, Inc./1984/Disk*



ALPHASAURUS



MOON MATH

Getting Ready to Read and Add

A Fresh Look at Matching

GETTING READY TO READ AND ADD contains six different matching games: Beam Up, Alphasaurus, ABC, Letter Getter, Moon Math, and Number Chick. The games are designed for preschoolers as well as for children in kindergarten or first grade. Parents will have to be on hand to help, because the menu requires reading, but once a game is selected, kids can operate it easily after only the briefest introduction.

In Beam Up, a shape appears in the upper third of the screen. Other shapes appear, one by one, at the bottom of the screen. When the bottom shape matches the top one, children press any key to signal a match. If the match is correct, the bottom shape will "beam up," accompanied by an interesting sound effect. The nice thing about this game is that the shapes aren't just the old square, rectangle, triangle, circle set that crop up with such boring frequency in learning games. The shapes are novel and children have to pay close attention in order to achieve a correct match.

Alphasaurus features a dinosaur standing on a hill and a green sea serpent that rises from the water, pushing

a lowercase letter ahead of it. The dinosaur opens its mouth and emits other lowercase letters. When the dinosaur's letter matches the sea serpent's, the child presses a key and the sequence begins again. Lowercase letters, especially those that are easily confused by young children (the d, b, q, p, for instance), may require just the extra practice that this game offers. For parents who play with their children, Alphasaurus can give them a clear indication of which letters their youngsters are having trouble with and they can then use this program to custom design a game using just those letters.


ABC features capital letters in matching game format. For the youngest user, ABC and Beam Up are probably the easiest games to master. The screens are very clean and the pace of the games can be preset to fit an individual child's abilities.

Letter Getter combines the knowledge gleaned from Alphasaurus and ABC. Now children must match a lowercase letter with its uppercase partner.

Moon Math features two hills, or mesas, with a moon base in between. A number is delivered to one mesa by a small "space transport." Other numbers appear one by one on the other mesa. When the numbers match, the child presses a key, the moon base be-

gins to glow and laser beams zap both numerals.

In Number Chick the child is again asked to match a numeral, but this time to a number of squares on a die. This requires careful attention and the ability to count. If a correct match has been made, a small bird will fly up, get the numeral, and place it below the die. A big, yellow chick then chirps the same number of times as the numeral.

The format in all six games is similar. This allows a child to go from game to game without having to learn a new set of rules each time. The activities themselves are extremely well structured, easy to understand, and educationally sound. Graphics and sound are effectively used to reward learning and children do feel a real sense of pride when they master a particular skill. These programs can be very effective when used as part of a comprehensive effort to teach basic academic skills. The manual is truly excellent and a change option allows parents to tailor each program to a child's current needs. For parents who are serious about introducing basic academic skills and who are willing to spend time helping a child master these programs, GETTING READY TO READ AND ADD provides solid assistance. 

Designed by Marjorie Cole for Softcole Sunburst Communications/1983/Disk

Software for Pre-Readers

Learning Fun for Little Ones

Reviewed by Joyce Worely

Colorasaurus

Leaping Lizards! It's a dinosaur coloring book for preschoolers! Kids from three to six have a treat in store with Colorasaurus, as they learn to recognize and remember colors in simple games that require no reading skills to play. Finally, there's a huge dino to paint on screen, and kids blend primary colors to produce new hues.

A picture menu lists three games, selected by a joystick-maneuvered cursor. The first, Match, displays three miniature dinos in varying colors across the bottom of the screen and requires the child to match each with the appropriate color box at the top. The action is toddler-simple. Just use the joystick to move the cursor to touch one of the lizards. This picks up the creature, and the joystick moves it to the box that matches its color. Pressing the joystick button releases the monster and drops it into place. If the hues match, the dino stays in the box; if not, it falls back to the bottom of the screen for another try.

When the three dinos are properly matched to their color boxes, the view changes to a primeval landscape of jungle foliage with mountains in the background. The three colorful colossi inhabit this tranquil scene, wagging their tails and chomping giant lizard gums in humorously animated syncopation.

The color matches begin with easy contrasts, but as the game progresses the hues get more similar. The first round might feature, for example, orange, blue, and green—easy shades for even the youngest child to recognize. But very quickly, the offerings call for more complex matches that require more discernment, as the computer generates three shades of the same color, such as tan, pink, and salmon, or

light, medium, and dark purple.

The second entertainment, Find, is more difficult. The screen is dominated by six color boxes with a dinosaur at the bottom. The child must pick up the giant lizard and drop it in the appropriate box. An incorrect choice makes it fall gently back to the bottom of the screen for another try. If the colors match, the lizard disappears, and the six boxes are shuffled in their positions. Then the player must find the dino's hiding place by choosing the correct color box to achieve the pleasant animated scene of graceful grazers.

As with the first game, Find begins with very easy challenges. It's not difficult to remember one distinctive hue. But as the game progresses, the child has to find matches for two dinosaurs, then finally for three, and the colors grow more similar. It's difficult to remember the hues when there are three lizards hiding among boxes of nearly identical shades.

The third entertainment is the title game, Colorasaurus. One huge dino fills the screen, with five coloring pots across the top. This simple painting program is a snap to use. Simply move the cursor to a paint pot, and pick up some color by pressing the joystick button. Then move the cursor to the dinosaur and press the button again to paint a segment of its hide.

The fun comes in mixing the colors. Three of the paint pots contain the primary hues—red, blue, and yellow—and the other two hold black and white paint, for changing the tones. These colors blend just like oils; a section of blue dinosaur that's touched with yellow turns into emerald green. A red patch of lizard skin turns lavender when mixed with blue. Tone the shades by adding white to make them lighter, or black to create more inten-

sity. Add more color for still another tint.

The finished painting will probably look like a patchwork quilt, with as many hues as Joseph's coat. Or the gargantuan monster can be painted in one solid color that's mixed to the exact hue that tickles the tot's fancy. It's a lot like a simple set of finger paints, but with none of the mess, as kids mix and blend the colors right on screen instead of on your best carpet.

The three entertainments in Colorasaurus are designed to help kids learn to match colors, discriminate between similar hues, improve visual color memory and concentration, and finally, to teach children how colors are blended. There is no scoring; if the child makes a mistake, there's always another chance to do it right. Although kids need only minimal guidance to start playing alone, participating parents can add to the learning experience by taking advantage of this chance to teach tots the names of the various colors and shades.

A musical score adds richness to the experience, and the uncluttered graphics, though not exactly state-of-the-art, are charmingly amusing. The miniature dinos look quite appealing, stomping and chomping in their peaceful valley. And the paintbox section of the program seems bound to become a favorite entertainment of young mixologists as they paint and re-paint the stylized tyrannosaurus. **A**

Colorasaurus Designed by Rosette Costello and Jeannie Green, The Learning Company/1984/Disk

Delta Drawing

This all-age program has something for everyone from four to forty years old. It's a way to draw pictures on the computer, but more than that, it also

provides some basic knowledge about computer graphics and programming. For pre-readers just getting started on the computer, Delta Drawing provides a good way to learn simple drawing techniques. For older computerists, Delta Drawing is an introduction to the concepts of programming. It will take a lot of time to explore its capabilities, making this a cartridge the whole family can grow with.

Fortunately, the program comes with a well-conceived manual that makes it easy for the novice to get started. By following the steps outlined in this guidebook, the user quickly learns to draw simple images. It's so easy, even the youngest child (with some instruction from a parent) will soon be programming the computer to draw pictures.

When the program is initially loaded into the computer, a blank screen holds nothing but the Delta pointer—an arrow that serves as cursor and drawing pen. This pointer moves over the screen by simple commands. Press D to draw a line, R to turn right, L for left, and so forth.

Using these simple keyboard commands, the child can maneuver the pointer on screen to produce squares, triangles, and even circles. These movements are actually programs that can be saved, and then redrawn on command or combined to form new pictures. Programs can be viewed in two ways, either as a graphic display, or as a text display of the commands that make up the picture.

There are a wealth of features to expand the capabilities of the computer artist. Commands can be repeated automatically to echo drawings and designs. A high-speed setting makes the computer draw more rapidly. By programming the pointer to take smaller steps and turns, it produces smoother curves and more detailed drawings. Color commands make it possible to draw lines in color, fill closed shapes, and change background hues. There are even eight levels of brightness to make different elements of a drawing pop off the screen.

All of these options are accomplished by single-key commands, easily understandable even by very young children. Once they develop facility with the basic operation of Delta Drawing, specialized commands expand its capabilities even further. The computerist

can change the size of drawings, enlarging, reducing, squeezing a drawing to make it tall and thin, or stretching a drawing to make it short and fat. Reverse and Mirror commands make it possible to draw symmetrical figures; a Kaleidoscope feature lets the artist create pictures with four-way symmetry. There are even commands and instructions for creating action graphics.

The entire program is explained in a step-by-step learning manual that is easy to understand and will have the computerist writing programs for simple images in no time. More complicated illustrations will take longer. But practice makes perfect, and Delta Drawing provides a good introduction to programming, as computer artists learn to write commands that create images on demand.

Delta Drawing. Designed by Computer Access Corp., Spinnaker/1983/Cartridge

Learning With Leeper

There are hours of entertainment in store for preschoolers with this well-designed program for youthful computerists. Kids from ages three to six can choose from four learning activities, each designed to provide a head start for tots who haven't yet begun to read. The program requires only minimal parental assistance to get the child started, and then the player proceeds at his/her own speed with no adult supervision required.

The four activities help prepare children for school by focusing skills needed to learn to read, write and do arithmetic. Through simple yet engaging games, the child gets practice with shape matching, counting, and hand-eye coordination, plus an entertaining way to express creativity.

The program is controlled by joystick and is menu driven to make it easy for young computerists to choose the activities. The child picks the game by moving Leeper, the on-screen guide and playmate, to one of the four corners, where pictures signify each entertainment.

Dog Count challenges the learner to choose the correct number of bones for the dogs lined up on the left side of the screen. The dogs, sitting patiently in a row, wait for the child to move Leeper up a column of bones. A push of the

button chooses the number of bones to feed these hungry mutts. A correct selection sends bones to the dogs' dishes and the tail-wagging canines show their appreciation for the tasty treats. Choose too few, and the doggies that don't get fed bark in displeasure.

A six-level matching game, Balloon Pop, gives kids practice at recognizing shapes, letters, and numbers. An object is displayed on a platform on the right side of the screen. Below are four similar items, only one of which is an exact match. A colorful balloon with a dangling hook floats overhead, and the gamer has to steer the balloon to the correct item to match the one on the platform. This game gives the child practice in reading readiness skills, by matching letters, simple drawings, symbols, and even three-letter words.

Leap Frog is a hand-eye test that helps youngsters acquire the coordination needed for writing. The computerist must guide a toad through a maze, avoiding collisions with the walls, and trying to stay a hop ahead of a pursuing caterpillar. Successfully traversing the maze produces a more challenging layout on the next try, as the child grows more adept at steering the frog.

The final activity is Screen Painting, a colorful book for young artists. The gamer guides a cursor over the on-screen paintbox, to select colors or drawing styli. There are several pre-drawn pictures included to be painted, or the young Rembrandt can draw directly on screen, piloting the cursor with the joystick.

Disappointingly, the color selection is very limited. There are seven hues of blue and brown; it's a pity the greens, yellows, and lavenders contained in the other games weren't added to the paintbox. Despite this, the coloring book is fun. And, when the user is ready to draw pictures directly on the screen, there's plenty of chance to express creativity.

The four activities in Learning With Leeper are pleasant and amusing to use. The graphics are simple, unassuming line drawings, and bright melodies counterpoint the action. Learning With Leeper is an entertaining computer experience in which the educational aspects are sugar coated to put the emphasis on fun. **A**

Learning With Leeper. Designed by Nancy Anderton, Sierra/1983/Cartridge

A Vidtex System Grows in Erie

Cable television companies often provide public access channels to the local school district. Then, it is up to the school district to decide what to do with this free air time. A common approach is to install videotex systems, that display information for TV viewers. That usually means a substantial investment for a school system, unless they are lucky enough to have a clever Atari user group like SAGE (Spectrum Atari User Group of Erie) in their town.

Pat Ferrito, the public information director of the Erie school district, decided to install a videotex system in late 1984. He intended to broadcast school information over the channel provided by the Erie cable TV franchise. "We would broadcast the lunch menu, sports events, PTA meetings, open houses, kinds of information that the public might want or need. Then he discovered what it would cost. "It might cost a lot of money, maybe \$20,000," he said. That slowed down the progress of the videotex system considerably. Ferrito had to spend time looking for the best, most economical way to bring videotex to Erie.

Enter Atari in the form of Bob Tirak, a member of SAGE, the Spectrum Atari Group of Erie. Tirak works for the Erie School District and spoke to Ferrito about using an Atari to generate text. "I was pondering buying TV equipment [for a videotex system] when I was told that there were other ways of doing it" Ferrito said. "So I went out and bought an inexpensive Atari computer and saw that it was possible." Two people that helped in the initial installation were SAGE member Dan Christoffersen, and Jack Fetzner, who is an employee of the school district.

What attracted Ferrito was the possibility of savings, and he has not been disappointed. "So far the cost to the school district has been about \$250,"



said Richard Olson, the president of SAGE and the one who handles advanced programming of the system. Olson stepped in when Ferrito got enthusiastic about the system and wanted to do more complicated things, like presenting the school system's budget, changing colors, typestyle and type size so the effect is more appealing, and some graphics. Olson is donating his time on volunteer basis. "He has been extremely gracious," Ferrito said.

"What's really exciting is that we did it quite quickly and inexpensively," Ferrito said. "In less than a week we were disseminating information to the public." The Erie county school system uses an Atari 800 for a text generator. They also have a printer, two disk drives, and a koalapad.

Cable T.V. professionals are impressed by what Erie has done. Sue Miller-Buske, the executive director of the National Federation of Local Cable Programmers, was very excited about the Erie system. She calls it "pretty darn unusual" for a school system to produce videotex for under \$250, as Erie does. She explained that character

generators run from a minimum of \$1,500 to professional-quality systems of over \$20,000. "What they're doing is really unique," she said. "I've known people who've done it with Apples, but of course they're more expensive. I've never heard of anyone who's done this sort of thing with an Atari."

In a suburb of Erie, the Mill Creek Township school district is broadcasting with a \$1,900 character generator that is part of a full studio. "Our studio's pretty well equipped," said Dr. Solomon, the assistant superintendent of schools for the township. "We're fortunate to have devices of this kind in the community and we've tried to get a lot of public information out. Our center was established 10 years ago and we started buying stuff then." He is proud of his broadcast quality. "There's a big mistake made in putting out low-quality signal," he said.

Mike Williams, the programming director for American Television Communications (ATC) who gives Erie their access channel, is pleased with the usage the Erie school district has of their channel. "I think it's a terrific outlet for getting to parents," he said. Williams is also pleased with the quality of the text generated by the Atari. "It looks good, very legible," he said. I was afraid we'd have problems, but it looks sharp."

Erie's videotex transmission is aided by the modulator that ATC supplies. With it, Richard Olson is looking forward to producing overlay titling at future school board meetings. "The modulator is in a sense a mixer," Olson said. "We plug the Atari into [the] camera 2 [outlet], go to preview mode, and show our picture, then switch to camera 2 to show our text."

For more information on Erie's videotex system, write to SAGE, c/o Richard Olson, P.O. Box 10562, Erie PA 16514-0562.

—P. R. Adler

An Interview with AtariSoft

Does anyone out there remember "Have you played Atari today?" That was a long time ago. Today, ATARISOFT, the company within a company of ATARI CORP., is working on productivity, educational, and business applications. A more appropriate ad jingle would be "Have you worked Atari today?" or "Have you learned Atari today."

The *Atari Explorer* conducted an interview with Sigmund Hartmann, the president of ATARISOFT in April. He was accompanied by John Skruch, Leonard Tramiel, and Richard Frick.

AE: Tell us about your plans. Do you have any special philosophy?

Hartmann: Our philosophy is to make Atari hardware available to any software developer who has recognized name in the market place so he can independently develop software. It's an open system. He can sign a license with us where we market and distribute his software, or he can sell it on his own. We want to make sure that developers know the options and are free to select that which fits their business plans.

AE: Where is most new Atari software coming from?

Hartmann: Most of the new software is coming from outside developers. The major reason is, is that if you look at the small companies, two, three, four person companies, the third party software developers, they're very creative and highly motivated. We want to capture that talent, that creativity.

AE: What about the larger software developers?

Hartmann: Larger developers have experience, developed expertise. They



Sigmund Hartmann, President, Software

play an important part in the picture, also. What they have that we want is a recognized name in the marketplace. In the past people have linked the Atari name with games. We are pushing the pendulum over to other areas right now, such as education and productivity. The larger houses have reputations in that area.

AE: Do you care who writes software for Atari computers?

Hartmann: Yes, anyone who writes for our computers has to be good. Our goal is to insure that the consumer has the best and widest range of software choices, whether the program is under the Atari label or not.

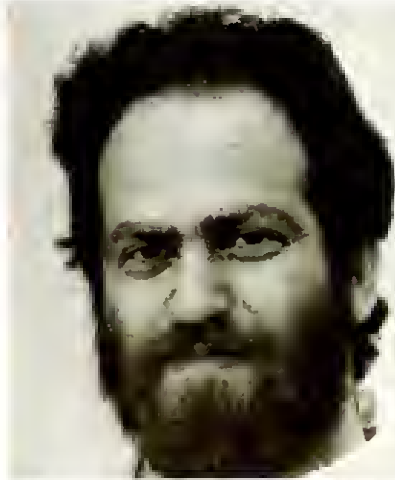
Skruch: When we review a software program written for another computer we always ask the developer, "Now

that you have done the program once, what would you do to make it better?" For instance, when we reviewed *Silent Butler*, Ted Goldstone himself suggested certain changes, improvements he would like to see in the program, and he instituted those in the Atari version.

AE: How do you decide what to accept into the product line?

Hartmann: When you say "the product line," you mean software that is marketed under the ATARISOFT name. It's important to keep in mind that anyone who wants can write software for our computers and do the marketing themselves.

Skruch: When it's a question of us doing the marketing, we get very careful. Before we accept a product into our



Richard Frick (l), Product Manager, ST line; Leonard Tramiel (c), Vice President, Software; John Skruch (r), Product Manager, XL and XE lines

product line, we ask a developer to do three things. First, we ask them to review their programs against similar programs on the market, and provide us with a comparison chart. Second, we ask for a business plan with the target audience, costs, recommended price and number of projected unit sales. The third and most important thing we do is we ask the developer if they would buy the program with their own money.

AE: That seems like a pretty tall order for those developers.

Hartmann: Not really. We've got a jillion smart people working out there. We are looking for people to "push the envelope" of all our machines to new boundaries.

AE: You mean the 800XL and 130XE in addition to the ST series.

Hartmann: Absolutely. And the developers agree, they see that it's worth it. The ST has generated interest in Atari's other machines as well.

Frick: You know the general reaction of developers to the ST is "Let me at it!" The ST represents a quantum leap in two ways. One, it's a great machine, a great use of advanced technology. Two, the price-performance ratio is unmatched.

AE: What features of the ST make it so attractive to programmers?

Tramiel: It's incredibly fast—the processor runs at 8 megahertz, which is just a bit faster than a Mac (7.9 mHz). For comparison, consider that the 800XL runs at 1.79 mHz, and the IBM PC runs at 4.77 mHz. Actually, these

comparisons underrate our machine a little, since a 68000 microprocessor running at 4.77 mHz is faster than an 8088 running at the same speed. It has built-in interfaces, both hardware and software, for disk drives, parallel printers, RS-232, and MIDI support.

It also has extremely high resolution in the monochrome mode, and better color resolution than most. Another plus is built-in software for graphics primitives, such as circle, line ellipse, box, and bitblt (an animation technique), plus the GEM window manager, which is like having a desk-top subroutine built into whatever you write.

AE: What about the 130XE?

Skruch: The 130XE is a 128K computer which is software compatible with the 800XL, (which has sold almost 500,000 units through 1984) and all of its features, plus 64K of extra memory, which is good for data storage and RAM disk. The additional memory is set up so that the Antic chip and the 6502 can access it together or independently. This also makes possible high resolution graphics and smooth animation. The 130XE also has effectively 200% more memory than the 800XL. This allows the programmer to store more of his program in the machine and less on the disk. This RAM disk capability speeds the machine up considerably.

AE: What new software for the 130XE is coming out this month?

Skruch: Well, we have *Proofreader* coming out, which is a wonderful addition to the existing Atariwriter system.

We're also very excited about *The Learning Phone*. *The Source*, *Control Data* and *Atari* are working together to provide our customers with a full year's subscription and an hour's connect time. So that's an additional \$32.00 value right there.

Silent Butler is a good home-management program that exists for many machines already, and our version is the fastest version of the program that exists, faster than the IBM PC version.

On forthcoming products, *Atariwriter Plus* is the most important. *Atariwriter Plus* could very well sell 130XEs, instead of the other way around. It has all the features of *Atariwriter*, plus all the best improvements and innovations our *Atariwriter* users requested in the past two years. *Atariwriter Plus* has a mail merge feature, an 80-column editor, and a spelling checker.

AE: What about the ST? Tell me about software for that.

Frick: First and foremost, we have the GEM system. That allows the user to access, enter and save files, and easily run programs. We have *LOGO*, and *BASIC* is in development; there's also *DB MASTER*, a spreadsheet that is an improvement over the most well known program of the type.

Our developers received a C compiler and a lot of software development software.

AE: Is there more?

Frick: Most ST software is going to come from third-party developers. We've sent out a lot of development systems and a lot of documentation packages. I think we'll surprise you. ♣

Revolution and all that) there were typewriters. Millions of them. Typewriters represented the fastest and most productive way to handle correspondence, reports, and other writing that people once penned by hand. Skilled operators were trained to use a typewriter, which then was considered a high-tech product.

As time went on, improvements were made to typewriters. In the 1960s when I started to use typewriters, some machines were manual, some were portable, and some were the state-of-the-art—IBM Selectrics. Still, it took skilled typists to get the most out of the machines. To many people like me, typing was a chore to avoid at all costs.

Then in the early 1970s, IBM figured out a way to attach a Selectric typewriter to a storage device. They called it the Magnetic Tape Selectric Typewriter (MTST). If you can imagine a typewriter with an umbilical cord to a floor-standing machine, half the size of a dishwasher, containing a reel of magnetic tape enclosed in a square cartridge, you've got a good idea of the MTST. With the ability to actually manipulate text, mere typing had blossomed into word processing.

By the late 1970s, the MTST was surpassed in functions, features, and price by dozens of other products, but these dedicated word processors still cost many thousands of dollars. The normal everyday person could not afford one of these expensive machines; even professional writers longed for only a Selectric typewriter.

At the same time the plethora of dedicated word processors became available, we heard rumblings on the West Coast about something called an Apple that supposedly would bring the power of computing, and eventually word processing, to everyone—the Apple computer that began the popularization of microcomputers.

What is Word Processing

Basically all word processing programs perform the same task. It's how they get the job done that distinguishes one from another. Regardless of the particular word processing program in use, the functions, commands and features can be separated into two distinct parts: editing and formatting.

Editing refers to typing in, inserting, deleting, copying, and moving text.

Text is made up of letters, numbers, and characters. Unlike typewriters, which print words on the page as they are typed, your TV screen or monitor displays what you type. As you type, the computer memory stores your text in electronic form. Also, most computers use a keyboard that is almost identical to that of a typewriter, although the placement of special characters is sometimes different.

Formatting refers to controlling how your text will appear on paper. Through the program, you define the format of your text—the margins, typefaces, justification, spacing, and other factors that determine how your document finally looks on paper. The word processor communicates your commands to the printer via special codes and instructions. Usually it sends these codes to the printer automatically when you give the word processor a specific formatting command.

How They Work

The way that you tell the word processing program what to do is through what is called the *human-computer interface*. Although the term sounds imposing, this human-computer interface is nothing more than the way that you and your computer interact. In the case of word processors, there are five types of interfaces.

The first type of interface is called *mnemonic*. This method involves using commands that are easily memorized because they are in some way similar to what they actually do. For example, the letters A and Z are the first and last letters of the alphabet and when used with another key, like the Control key, usually tell the program to position the cursor at the beginning (A) and end (Z) of a line of text. LJK's *Letter Perfect* uses mnemonic commands such as these.

Mnemonic commands are easiest for touch typists because those users don't need to keep looking at the keyboard to verify their hands' position. Also, the keys that invoke the commands are evenly spaced on the keyboard and can be used with both hands. This allows faster and more error-free operation.

The second type of interface is called *positional*—the keys that are used for the commands are positioned to indicate what the command does. For example, imagine the following keys on a keyboard: S, D, E, and X. These four

keys produce a diamond shape (use a little imagination). When used with the Control key, the S and D keys move the cursor left and right, and the E and X keys move the cursor up and down, respectively. This is how you move the cursor throughout your text with *WordStar* by MicroPro.

The positional command interface is quicker for the nontypist to learn because a glance at the keyboard verifies the function. Also, with some practice, your fingers will automatically learn the position of the keys.

Next is the *symbolic* command interface. Here, keys are chosen that look like the meaning of the commands. For example, the *R* key means move up. Likewise, the *<* and *>* keys signify move left and right, respectively. *Atariwriter* uses the symbolic arrow keys together with the Control key to let you move around within your text. Using letter symbols for functions is a good idea, until you run out of symbols. How would you represent Save File, for example, with a key on the typical keyboard?

Another type of command interface involves the use of *special function keys*. The Atari computer has three special function keys on the right side of the keyboard: Start, Select, and Option. Commands such as Select (to choose a file to load) or Start (to begin a search operation) represent this type of interface. *Atariwriter* uses the special function keys on the computer quite often. Commands such as Option-F (determine how much memory is available), Select-T (move to the top of the file) and Option-M (move a previously marked block of text) are good examples of effectively using the function keys within a program.

The advantage of using special function keys is that the key is dedicated for a specific use, and there is no confusion. However, using these keys requires bigger hand movements and therefore takes longer. Also, when a word processor has many commands, having many dedicated keys on the keyboard takes up much space and can be overwhelming. *Atariwriter* avoids this proliferation by combining the use of function keys with mnemonic labels.

The final type of command interface is the use of *menus*. Just as you choose what to have for dinner from a list of choices on the menu, a word processing program's menu lets you choose what function to perform. Menus are

the easiest for the novice to use and can be structured so that layers of menus and submenus (a menu tree) can contain all the functions of the program. Unfortunately, using a menu-only command interface can make it time consuming to do the simplest thing. As the user becomes familiar with the word processing program, the menus eventually become a nuisance.

The old *Atari Word Processor* used a series of menus for its command interface. Even the simplest command, like saving a file, required you to select from several menus to do what you

wanted. Thankfully, the *Atari Word Processor* was replaced by the simpler *Atariwriter*.

So which type of interface is best? Most experts and users agree that a combination of menus and mnemonic commands works best. This way, the inexperienced user can learn quickly with the help of the menus, and the seasoned user can give direct commands. The *Atariwriter* is a good example of a word processing program that uses several interface types. When the program first loads, a short main menu appears. There are no secondary

menus, and each menu command is executed instantly. If you choose Edit, for example (to do your typing and editing), you then have a variety of mnemonic, symbolic, and function key commands available to you.

What Else Should You Know?

The first step in choosing a word processor is to decide for what purposes you will be using it—a word processor for casual home use and one for daily business use are two com-

Word Processing Programs: A Comparison

	Atariwriter	HomeWord	Letter Perfect	PaperClip	Super Text	Writer's Tool
Command Interface						
Mnemonic	Y	Y	Y	Y	Y	Y
Positional	N	N	N	N	N	N
Symbolic	Y	Y	Y	Y	Y	Y
Function Keys	Y	N	N	Y	Y	Y
Menu	1 level	1 level	2 levels	None	1 level	None
Documentation						
Tutorial	Y	Y	Y	Y	Y	Y
Reference	Y	Y	Y	Y	Y	Y
Glossary	N	Y	N	Y	N	Y
Quick Ref Card	Y	Y	Y	Y	Y	N
Special Notes	N	N	Y	Y	Y	Y
Features						
Insert	Y	Y	Y	Y	N	Y
Overwrite	N	Y	Y	Y	Y	Y
Move Cursor						
By Character	Y	Y	Y	Y	Y	Y
By Word	N	Y	Y	Y	N	Y
By Paragraph	N	N	Y	N	N	N
By Page	Y	Y	Y	Y	Y	Y
By Block	N	N	Y	N	Y	N
Center Text	Y	Y	Y	Y	Y	Y
Boldface	Y	Y	Y	Y	Y	Y
Underlining	Y	Y	Y	Y	Y	Y
Shows on screen	Y	N	N	Y	N	Y
Search/Replace						
Conditional	Y	Y	Y	Y	Y	Y
Global	Y	Y	Y	Y	Y	Y
Undo Command	N	Y	N	Y	N	Y
Save Files						
Warning it exists	Y	Y	N	Y	Y	Y
Shows file name	Y	Y	Y	Y	Y	Y
Auto Backup	N	Y	N	Y	N	N
Merge Files	Y	Y	Y	Y	Y	Y
Chain Files	Y	Y	Y	Y	Y	Y
Page Numbering	Y	Y	Y	Y	Y	Y
Justification	Y	Y	Y	Y	Y	Y
Headers	Y	Y	Y	Y	Y	Y
Footers	Y	Y	Y	Y	Y	Y
View Print on Screen	Y	Y	Y	Y	N	Y
Printing						
Double Column	Y	N	N	Y	N	Y
Selected Pages	Y	Y	Y	Y	Y	Y
Multiple Copies	Y	N	Y	Y	Y	Y
Send Escape Codes	Y	Y	Y	Y	N	Y
View Directory	Y	Y	Y	Y	Y	Y

pletely different programs. Then narrow your choice to one that will be easy to use at first but will also let you grow with it as you gain more experience. The next task is to determine how easy it will be to learn and use. The best way to determine this is by evaluating the documentation.

Good documentation for microcomputer software is still relatively hard to find, but the situation is improving. The manual for your word processor should contain four components. First, there should be a tutorial. This *tutorial* should explain (with plenty of examples and illustrations) how to use the various functions of the word processor. It should start out at a simple level and finish with more advanced and seldom-used commands. It should always be clear what you are supposed to be learning at any given time. The *Writer's Tool* by OSS and *SuperText* by Muse are two programs that have good tutorial sections. *HomeWord* by Sierra On-Line also has a good tutorial and even provides a cassette tape of lessons.

Next, look for a comprehensive reference section, containing a list of all commands, explaining in detail when and how to use them properly. It should also contain a complete index, a glossary of unfamiliar terms and appendices with information on error messages and what to do if you get stuck. *PaperClip* by Batteries Included and *Letter Perfect* by LJK both have good reference sections in their manuals. The information is complete and presented clearly.

The third component is a quick reference guide, a pull-out section of the manual or a separate card that gives brief explanations of the various commands and functions. At first you will be spending your time mostly with the tutorial and reference section but as you learn to use the program you will soon find yourself turning instead to the quick reference guide. Most of the word processing programs for the Atari computer contain quick reference cards. A good reference card, like the one that is provided with *Letter Perfect*, presents the information in two ways: an alphabetical listing of each command followed by the necessary keystrokes, and a categorical grouping of commands under headings such as Cursor Moves, Deletions, and Functions. This makes it easy to find a specific command even if you don't know

the correct name for it.

The fourth component of a good manual is what I'd call application notes—information on special uses of the word processor (like merging data bases with a text file), known bugs, compatibility issues, or advanced user features.

Of course, good documentation is inviting and easy to read, in clear and nontechnical language, containing no typographical errors. The manual should be organized to allow you to easily find the information you seek.

Features, Features and More Features

Now you know the word processor should be easy to use while you are a novice *and* when you have become an expert. You now know how to check for good documentation, but what features should you look for? That depends greatly on what you will be doing with your word processor.

Word Wrap. Almost all word processors for the Atari computer provide *word wrap*, an automatic carriage return that when a word being entered exceeds the specified line length relieves you of the burden of watching, as you type, and deciding where and when to end a line.

Options for Adding Text. Another useful feature is the ability to enter words in either insert or overwrite modes. When text is entered in *insert mode*, words that are already on the screen are moved to the right to make room for the new words. This prevents you from accidentally deleting, by typing over, words that are already on the screen.

Overwrite mode is just the opposite. Here, you type words in to replace some existing text. Once you do this, there is usually no way to recover the original text you replaced. If you are adding new text, use insert mode. If you wish to substitute new text for what is already on the screen, use overwrite mode. Choose a word processor that lets you decide which mode to use. *Atariwriter* has only insert mode, whereas *Letter Perfect*, *The Writer's Tool*, *PaperClip* and *HomeWord* allow you to choose either mode.

Cursor Control. The cursor (a highlighted square or underline) indicates the active editing point. What-

ever you type or delete will occur at the cursor. You should be able to move the cursor throughout the file. These commands should let you move the cursor a character to the left or right, to the beginning or end of any line, to the top or bottom of the screen, and to the beginning or end of a file. You should also be able to move forward and backward through your document by the block (or page). Cursor movement by word, sentence, and paragraph is also useful, but not mandatory.

Formatting Flexibility. Most word processors offer the ability to center text on the page for headings and titles. Also, you should be able to underline text and print in boldface. Some word processors, like *Atariwriter*, actually indicate on the screen (in highlighted or colored letters) the words that will be underlined. This helps you to imagine, before printing, how your text will look. Other word processors automatically divide words if they don't fit at the end of a line, and some offer the ability to set up tables with multiple columns.

Searching and Replacing. A search-and-replace function is absolutely necessary in a word processor. This allows you to find a particular word or group of words and change them, and it can work two ways. One way, the program finds each occurrence of your predefined word(s) and each time asks you if you want to replace the word(s). This is called *conditional replacement*.

Another method of text replacement is *global replacement*, which allows you to replace text automatically throughout the entire file with just one command. Global replacement is faster, but there may be times you only want to replace some of the occurrences of the text. Good word processors like *Atariwriter*, *Letter Perfect*, *PaperClip*, *Writer's Tool*, and *HomeWord* permit you to use either global or conditional text replacement.

File Control. This refers to how you and the program manage your text files. Once you have entered text into your computer and it is being displayed neatly on the screen, what do you do with it? You can print it, save it onto a disk, or change it some more. Eventually you will want to save the text on a disk. To do this, you select the

save command and choose a name for the file. But what if the name you selected already existed on the disk? You guessed it—the previous file is only a fond memory. You replaced the old file with the new text only because you chose the wrong name.

A good word processing program will tell you that a file already exists on your disk before you unwittingly replace it. The word processor will then allow you to either choose another name for the file or overwrite the existing file. Unfortunately, *Letter Perfect* does not check your existing files. Some programs also display the name of your current file before you save it so you do not have to retype the name. Also, seeing the name of the current file before you save it makes file naming less confusing.

In addition, a word processor should allow you to see a list (directory) of your disk contents at any time. A good word processor will also automatically make a backup of your text file. That way, if you accidentally delete text or make some other changes you no longer want, you can always return to the previous version.

Another file control feature is the ability to merge or insert one file into another. If you are editing an existing file you should be able to insert another file anywhere in the current file. If you do a lot of writing or think you will be creating long documents, you will want the ability to chain files. Since the computer memory is only so large, there is a limit to the size of any one text file. If you write a book, for example, you can save each chapter of the book as a separate file. When you print the book, you would chain the files together so that it would be printed as one continuous document.

Cutting and Pasting. Another useful feature of word processors is the ability to move blocks of text—a word, sentence, paragraph, or more. Typically, you select the text you want to move and then position the cursor where you would like the text to be placed. Then either a copy of the original text or the actual text itself would be inserted at the cursor. This procedure is usually referred to as *cutting and pasting*.

Other Features. Some features of word processors may not be used by everyone, but are handy to have. *Auto-*

matic page numbering is useful for articles, manuscripts, and reports. A good word processor will allow you to specify which page to begin numbering on and the page number to begin with. Another feature is *pagination* or *print previewing*, which permits you to see on the screen what the document will look like when it is printed.

Headers and footers are useful for longer documents. A *header* is a line—or lines—of text that appears on the top of every page. The *footer* similarly appears at the bottom of every page. You should be able to center, left-, or right-justify headers and footers and include the page number within them. (Left-justify aligns the text with the left margin, right-justify with the right margin.)

For academic writing you will need to create footnotes, so the word processor should allow you to use *super-scripts*. For scientific writing you need subscripts. (Super- and subscripts are the numbers and letters printed slightly above and below the normal printed line.) If you plan to use super- or subscripts, make sure your printer and word processor can work together to print them.

Another advanced feature that you may need after you have gained some experience is the ability to pass *control codes* to your printer. Printer control codes are special characters used by the printer to control its various functions. They are typically regular characters, preceded by the Escape Code (27) or used in conjunction with the Control Key. These codes allow you to directly control the printer from the word processor—to change fonts, underline text, or perform some other special operation.

The Human Factor

It is one thing to know what to look for in a word processor. It is still another thing to be comfortable using a word processor. Whether you will be a casual user writing the occasional letter to Aunt Claire or a heavy user writing several hours every day, it pays to choose a word processor carefully. Test drive the program before you buy it.

There are so many word processors for the Atari computer that you may feel overwhelmed. If you first decide what you will be using the word processor for, you can select the features and functions that are important. This will narrow the choice down to a hand-

ful. Then try each one out, typing a sample letter or other document to get the feel of the program. Be sure to inspect the documentation to determine how difficult it will be to learn to use the program. And don't forget to ask the opinion of friends who have used various programs.


Remember that there is usually a tradeoff between power and ease of use. A word processor that is very powerful will be more complex and take longer to learn. An easy-to-use program may lack powerful features that you really need. You may be happy with an easy-to-use, moderately powerful program like *Atariwriter* or you might need a more sophisticated program that is more difficult to learn, such as *The Writer's Tool*.

Any of a dozen different word processors will give you more power than the typists had using the IBM *Magnetic Tape Selectric Typewriter*. In any case, choose the best word processor you can find that will suit your needs.

The Promised Commercial?

I won't hold you in suspense any longer. Yes, *Atariwriter* is a good word processor. I am not saying that because this is the Atari magazine. I have been using *Atariwriter* and about a dozen other word processors for the Atari for several years. I am not saying that *Atariwriter* is the *best* word processor. I can think of at least three other programs that are more powerful, have better documentation, or contain exotic features. *PaperClip* has many features and is easy to use, *The Writer's Tool* is powerful and *Letter Perfect* allows you to use an 80-column board in older Atari 800 computers. You could not go wrong with any of these programs.

However, *Atariwriter* is just about at the head of the class when it comes to ease of use. Secondly, *Atariwriter* is the best value for the money, and it even works with the cassette recorder. Most word processors cost twice the price of *Atariwriter*.

Check the comparison chart to help you decide which word processing program is right for you. 

Arthur Leyenberger is a human-factors psychologist and freelance writer living in New Jersey. He has been an Atari enthusiast for almost four years. When not computing he enjoys playing with robotic toys.



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Blue Max 2001

Reviewed by Bill Kunkel

Sequels may have an awful reputation among film fans, but computer game follow-ups have fared much better. Programs such as MS. PACMAN and DONKEY KONG JR. have generally offered gamers the successful features of their progenitors, while adding a few new wrinkles and sprucing up the sound and graphics.

Unhappily, however, Rob Polin's successor to his enormously popular BLUE MAX is more likely to rekindle interest in the original than prove a viable entry on its own.

The setting here, as might be deduced from the title, is Earth in the not-too-distant future. Gamers are assigned the role of Max Chatsworth IX, descendant of the earlier game's World War I flying ace. Now, instead of a biplane, the focal craft is a singularly uninteresting flying saucer. Unlike the original aircraft, however, this baby is capable of multidirectional fire as well as being equipped with "gravonic annihilator bombs." Despite the silly-sounding name, these are no different from the bombs the original Chatsworth carried.

In fact, this game is plagued with ridiculous terminology and some of the shoddiest documentation since the days when computer software was sold in baggies. Earth has supposedly been conquered by the Furxx. The instructions are rife with references to "Furxx conversion processors" and "Furxx Time Masters," none of which has anything to do with the game itself.

From the documentation: "Your mission is to penetrate enemy defenses,

destroy their hoverfields, and finally destroy the symbol upon which the Furxx empire is built." After many, many hours of play, this reviewer is still unsure what this symbol is supposed to be.

Then there's the problem of figuring out which ground targets are which. Rather than picturing the various types of installations, Synapse has relied upon badly written descriptions. While discussing the two special types of targets, the following appears: "The other is called the Terrain Sequencer. You must, depending on the option chosen, either bomb or land on the sequencer to progress to the next enemy hoverfield. The sequencer looks like a small disk with a rotating core." Huh?

After several attempts, a player will eventually discover the sequencer (mostly through a process of elimination), but certainly no thanks to that muddled description.

The documentation is such a shambles that a second sheet was belatedly enclosed, under the banner "More Helpful Hints," informing the users that the sequencer only appears on the "crater level"—a term that shows up nowhere else in either instructions. However, because there are only two levels (play simply gets more difficult as the game progresses), this apparently refers to the first rack (then the third, fifth, seventh, and so on).

Okay, so even the worst instructions can be overcome through diligence and lots of playing time. BLUE MAX 2001's problems are still far from over. This sequel totally lacks the play value of the original. The flying saucer doesn't

bank, as the biplane did, and its maneuverability is questionable. Movement is too jerky and unpredictable while the collection of visual cues presented at the base of the screen may make play more of a challenge than most gamers will find acceptable. The data window constantly changes color, as in the original, but the four changes can be handled with practice. Then there are the letter cues. Four of them are explained in the instructions, but the letter X is never referred to, although it frequently turns up.

Much of the original game's appeal lay in its marvelous graphics, and although the visuals here are nice enough, they are not sufficiently varied to make extended play sessions rewarding. As previously mentioned, there are really only two scenes, and because the ground objects are not recognizable, as they were in BLUE MAX, it would have been nice if the instructions had told us what it is we're strafing and bombing.

BLUE MAX 2001 is not without its charms. There are some inspired touches, especially the ground installation that fires a shaft of electricity (?) straight into the sky as the player's craft passes overhead. The problems, unfortunately, outweigh the plusses, and, unlike its predecessor, BLUE MAX 2001 does not invite compulsive play. After a few minutes of struggling with the play mechanics and, having seen virtually all there is to see, most users will find themselves popping the original back into their drives.

BLUE MAX 2001, *Designed by Rob Polin, Synapse/Atari computers/48K disk*

Computer Ambush

Reviewed by Arnie Katz



Most wargames, computer or nonelectronic, view the conflict from the general's headquarters. The player assumes command of a sizable armed force and must create a strategic plan to accomplish key objectives and satisfy the game's victory conditions.

This is what might be called the clean-hands approach to combat. The actual fighting is handled in an abstract manner, usually a mathematical comparison of combat factors as they are modified by terrain and weapon-range considerations.

COMPUTER AMBUSH looks at warfare from the opposite end of the telescope. This World War II simulation for one or two focuses on small-unit battles involving no more than a squad on each side. Each soldier is fully individualized and has a unique set of abilities and, often, specialized weaponry.

The program provides a dozen scenarios, five of which are for solitaire play and the rest for head-to-head gaming between two human commanders. Novices should start with NCO Training, in which four American soldiers must secure the village by killing or incapacitating all German troops in the area. Other solo scenarios are an ambush of a German squad, a raid on a communications center, infiltration of an enemy-held area, and the defense of a barn. Two-player games include enhanced versions of the ambush and infiltration missions, the defense of a factory, an assault on German position, an alley fight, a meeting engagement between opposing squads, and a free-form set-up option.

Any of these minigames can be played with the standard array of infantrymen, or the computerist can customize the squad. Simple on-screen prompts alter any soldier's vital statistics or create a new one from scratch. Such new or revised squads can be saved to disk for use in subsequent play sessions.

The player programs each man with a special code. It takes quite a string of numbers and letters to instruct a trooper to do something as elementary as run around the outside of a building, fall prone, and fire at anyone who appears in the doorway. Fortunately, the instruction book explains the order-entry system thoroughly. Play-aid cards included with COMPUTER AMBUSH list the codes, which should help participants handle this tricky phase.

Possible activities for soldiers include walking, running, hiding, observing, shooting at specific targets or general areas, picking up and dropping weapons, and much more. The action unfolds on a map of a typical European town with lots of buildings, walls, and hedges. COMPUTER AMBUSH can be played with unlimited sight or blind. In the former case, a commander always knows the location of every enemy soldier, while the blind play introduces the concept that an enemy who has not been spotted by a friendly observer is effectively invisible.

COMPUTER AMBUSH has fairly

crude graphics. The map of the town is a simple line drawing devoid of embellishment or detail. The first letter of his last name signifies each friendly soldier's position, and a nationality symbol marks each visible foe. The program does include a few sound effects, which can be turned off to facilitate silent play during those all-night compu-wars.

Larry Stawser's programming of COMPUTER AMBUSH for the Atari is good, but flawed. Only an Evelyn Wood graduate could read the information on some of the screens that report the results of the order-entry phase as they flash past. Though it was probably commercially impractical to do so, it's too bad that this edition of COMPUTER AMBUSH doesn't exploit the Atari's audio-visual superiority.

The rulebook and dossier of soldiers are both exceptionally well-written. The complete instructions make this complex military simulation readily comprehensible, while the biographies and sketches of the American and German fighters contribute a needed note of humanity. After all, COMPUTER AMBUSH simulates man-to-man conflict, not the impersonal clash of armies. The dossier is a consciousness-raising exercise for any compu-commander. That's not just a counter you're sending into the teeth of German fire, it's good old lovable Denny "Dim-Wit" Dumke.

Laugh at anyone who says that COMPUTER AMBUSH is a state-of-the-art computer wargame, but add it to your collection if you want a truly unique gaming experience. This one is a classic. ▲

COMPUTER AMBUSH, *Designed by Ed Williger and John Lyon, Strategic Simulations/48K disk*

BOUNTY BOB STRIKES BACK

Reviewed by Arnie Katz

It has taken Bill Hogue roughly two years to develop this sequel to 1983's undisputed electronic game of the year, MINER 2049er. After several false starts, including the ill-fated SCRAPER CAPER, the author has finally given the gaming world this 25-screen climbing and jumping contest featuring that

intrepid ex-Mountie, Bounty Bob.

The theme is essentially a rerun of the original concept. Bounty Bob is still on the trail of the dastardly Yukon Yohan, who is hiding somewhere in Nuclear Ned's abandoned asteroid mine. Each screen symbolizes one

CONTINUED ON 76

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```

/84|"
30 ? " |-----|
| "
40 ? " |
| " | " ? " |
| "
50 ? " |          1) RENAME FILE
| "
60 ? " |          2) DELETE FILE
| "
70 ? " |          3) LOCK FILE
| "
80 ? " |          4) UNLOCK FILE
| "
85 ? " |          5) DIRECTORY
| "
86 ? " |          6) FORMAT DISK
| "
87 ? " |          7) RUN PROGRAM
| "
88 REM ? " | 88 LEFT BLANK TO BE ADDED
LATER | "
89 ? " |          8) QUIT
| "
90 ? " |
| " | " ? " |-----|
| "
100 POSITION 7,17: ? "      ENTER COMMAND
";
110 TRAP 100: INPUT NUM: IF NUM=0 THEN M

```

```

UM=8:TRAP 5
130 ON NUM GOTO 150,200,250,300,600,70
0,800,1000
150 ? : ? "OLD NAME": INPUT FLN$.
151 ? "NEW NAME": INPUT MFN$.
152 A=LEN(FLN$): B=LEN(MFN$)
153 FILE$(1,2)="D:"
154 FILE$(3,A+2)=FLN$
155 FILE$(A+3,A+3)=","
156 FILE$(A+4,A+4+B)=MFN$
157 TRAP 1111: AIO 32,M1,0,0,FILES
160 GOTO 5999
200 ? : ? "FILE TO DELETE": INPUT FLN$
201 A=LEN(FLN$)
203 FILE$(1,2)="D:" FILE$(3,A+2)=FLN$
204 ? "ERASE ": FILE$, " (Y/N) ": INPUT M
FN$: IF MFN$(1,1) THEN 10
205 TRAP 1111: AIO 33,M1,0,0,FILES
210 GOTO 5999
250 ? : ? "FILE TO LOCK": INPUT FLN$
260 A=LEN(FLN$): FILE$(1,2)="D:"
262 FILE$(3,A+2)=FLN$
264 TRAP 1111: AIO 35,M1,0,0,FILES: GOTO
5999
300 ? : ? "FILE TO UNLOCK": INPUT FLN$
302 FILE$(1,2)="D:" FILE$(3,LEN(FLN$)+
2)=FLN$
304 TRAP 1111: AIO 36,M1,0,0,FILES
310 GOTO 5999
600 CLOSE M1: OPEN M1,6,0,"D:\*. *": DIM A
$(30): FOR N=1 TO 64: TRAP 610: INPUT M1:
A$: ? A$: NEXT M1: CLOSE M1
610 GOTO 5999
700 ? "FORMAT DISK #": INPUT M
710 IF M=1 THEN DR$="D1:" GOTO 750
720 IF M=2 THEN DR$="D2:" GOTO 750
725 IF M=3 THEN DR$="D3:" GOTO 750
730 IF M=4 THEN DR$="D4:" GOTO 750
740 GOTO 700
750 ? "FORMAT DISK IN DRIVE #": M: IMPU
T B$
760 IF OS<>"Y" AND B$<>"y" THEN RUN
770 TRAP 1111: AIO 254,M1,0,0,DR$: GOTO
5999
600 ? "RUN WHAT PROGRAM": INPUT FLN$
610 FILE$(1,2)="D:" FILE$(3)=FLN$
620 ? "LOADING ": FILE$: TRAP 1111: RUN F
ILE$
1000 END
1111 ? "ERROR- ": PEEK(195): TRAP 4000
5999 ? : ? : ? "OK, PRESS STOP TO G
O ON";
6000 IF PEEK(53279)<6 THEN RUN
6001 GOTO 6000
6099 REM
6100 REM THIS PROGRAM WILL SAVE TIME
6101 REM THAT WOULD BE USED FOR LOAD-
6102 REM ING DDS. IT CAN LOAD QUICK-
6103 REM LY, ACCESS SOME OF DDS' MOST
6104 REM USED COMMANDS, AND SEND YOU
6105 REM BACK TO YOUR PROGRAM. TO ADD
6106 REM A COMMAND USE THE BLANK LEFT
6107 REM FOR M8, AND BE SURE TO
6108 REM CHANGE THE B FOR A TO IN LONG
6109 REM 110 (IF NUM=9 THEN NUM=8)
6110 REM LEAVE THE TRAP STATEMENT.
6111 REM ADD THE FIRST LINE # OF YOUR
6112 REM ROUTINE ON LINE 130 BETWEEN
6113 REM THE 800 AND THE 1000.

```

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In the April/May issue of the Atari Explorer, we published a list of user's groups addresses around the country. Here are all the address changes and new groups we have heard of since the original list came out. Our thanks to all the people who sent in the updates. To get the full list of users' groups, refer to the April/May issue of this magazine, page 12. If you know of any active groups that are not on this list, please contact us at:

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SHERLOCK BONES

CONTINUED FROM PAGE 25

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Introducing ATARI EXPLORERS

What do real people . . . butchers, bakers, candlestick makers, the homemaker down

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We feature a creative and useful application to which an Atari owner has put his or her Atari personal computer. Many columns will include a program or special information that can directly benefit you. What are you doing with your Atari . . . or your friends, spouse, employees, or coworkers? We'd like to hear about it, and so would thousands of ATARI EXPLORER readers.

Welcome to the ROM Section!

With this issue, the *Atari Explorer* proudly introduces a guest section, especially for serious programmers and people who want to learn about the inner workings of their Atari machines. ROM magazine was the premier Atari publication of Canada. ROM's forte was always highly technical writing. Bob Cockcroft of ROM is a serious programmer, dedicated to pushing the envelope of Atari programming to its limit. There is very little about Atari that he doesn't know.

These articles are all tutorials with programs included. Keep reading this section, and you can learn a lot of the inside tricks that professional software developers use to program faster and better. Recently, ROM's publishers decided they would like to share their technical expertise with a wider audience. So here is Bob Cockcroft, with Robert Wall, presenting two articles that will help you get the most out of programming your Atari.

Here's what's inside:

Moving Around from Left to Right—A tutorial on Horizontal Scrolling.

How to Get Around Waiting Around for I/O—How to use built in I/O routines. With a subroutine you can put into your BASIC programs.



Moving right along: left to right

The Horizontal Scroll

by Bob Cockroft

Using the Atari's scrolling capabilities, you can create maps and images larger than screen size, and scan those images as if the screen were a periscope or moving window. This article will explain the basics of programming a horizontal scroll.

A horizontal scroll appears on the screen as if the image were moving from side to side across the playfield. Actually, a larger-than-screen image is stored in memory (RAM), and only parts of it are displayed on the screen in a sequence that simulates movement. In order to accomplish this, the image data is organized in memory and is displayed in a succession of horizontal lines.

You may already be familiar with the horizontal scan lines of a standard TV display. The ANTIC chip, a custom microprocessor dedicated to controlling the video display in the Atari computers, organizes the display in a stack of MODE LINES. Each mode line is from one to sixteen horizontal scan lines high depending on the graphic mode chosen. Several graphic mode lines can be combined for display by creating a program for the ANTIC called the DISPLAY LIST.

Horizontal Scan Lines

The ANTIC uses a total of 192 scan lines for displaying graphics or characters on a screen. This number is less than the 262-1/2 lines that make up a television field because television screens are overscanned, that is, the image edges are scanned beyond the boundaries of the picture tube and never seen by the viewer. The lines are scanned across the screen from left to right, and from top to bottom. Figure A illustrates a standard screen display.

The entire screen is scanned in 1/60th of a second. Then, the scan begins again in the upper left corner of the screen. With horizontal scrolling, illustrated in figure B, data can be larger than the screen display. The programmer must include all of the image in memory, but only a section of each line of the image is displayed on the screen. The beginning byte and ending byte per mode line is programmed for display in the display list.

Display List Instructions

There are several types of instructions and options used to program the ANTIC. The ones that concern us are blank line, graphics mode, and load memory scan (LMS). Blank line instructions display solid background colors and cannot be used to display graphics. They are used to move the graphics display down to the viewable part of the television screen. There are eight blank line modes. They differ in the number of horizontal scan lines they encompass. Table 1 is a list of blank line instructions.

Graphic mode instructions cause ANTIC to display either text or graphics in various resolutions. The modes occupy between one and eight lines with the lower resolution modes spread out over more lines. They also differ in the number of bytes they require per line. More screen RAM is required for the higher resolution modes. Since they occupy fewer scan lines, high resolution modes can be stacked in greater density to create the up to 192 scan lines of an ANTIC display. Table 2 outlines some of the graphic modes. Notice that the ANTIC instructions differ from BASIC mode instructions and include modes inaccessible with BASIC commands.

The area of RAM displayed on the

screen is determined by the Load Memory Scan (LMS) option. It is encoded in the display list as a three byte instruction. The first byte is the opcode. It tells the ANTIC chip "this is an LMS instruction" and it identifies the display mode. To form this instruction, just add 64 to an ANTIC mode instruction. For example, the LMS instruction for BASIC graphics mode 0 would be 64 + 2 (ANTIC instruction for BASIC mode 0) = 66.

The second and third bytes are the operand. They identify the starting location in RAM of the image display. Two bytes are required because the location is coded in LSM/MSB (low-byte, high-byte) form. Table 3 illustrates a three-byte LMS mode 0 instruction pointing to hexadecimal location \$600 (1536 decimal).

Every display list should begin with three instructions of 8 blank lines to bring the beginning of the graphics display into the viewable portion of the television screen. After this, a three-byte LMS instruction identifies the first graphic display mode and screen RAM

*Table 1
Blank Line
Instructions*

INSTRUCTION	# OF SCAN LINES
0	1 blank line
16	2 blank lines
32	3 blank lines
48	4 blank lines
64	5 blank lines
80	6 blank lines
96	7 blank lines
112	8 blank lines

location. Then, a sequence of graphic modes not exceeding 192 lines follows. The display list is terminated by a jump instruction to the top of the display list to repeat the display. Table 4 illustrates an example display list for BASIC graphics mode 2. The example uses twelve mode 2 lines. Since mode 2 contains 16 scan lines (see Table 2), the limit of 192 scan lines is observed ($16 * 12 = 192$).

The top of the display list can be found using the display list pointers: 560/561 decimal stored in LSB/MSB form. To determine the address location, multiply the contents of 561 by 256 and add the product to the contents of 560 as follows:

$$\text{ADDR} = \text{PEEK}(560) + \text{PEEK}(561) * 256$$

Horizontal Scroll List

When horizontal scrolling isn't needed, the screen image is usually organized serially in RAM. The last byte of information for the first scan line is followed by the first byte of information for the second scan line. An LMS instruction is used at the beginning of the display list to identify the starting location and mode. However, with horizontal scrolling, the memory is organized in lines wider than the screen display. So, some bytes from each line in memory are omitted from each screen display. The location where each line begins display must be programmed for the ANTIC microprocessor. Therefore, an LMS instruction is required for each displayed line of the display list.

Table 2 Graphic Mode Instructions

ANTIC INST.	BASIC COMM.	# OF COLORS	SCAN LINES	PIXELS/ LINE	BYTES/ LINE	BYTES/ SCREEN
2	0	2	8	40	40	960
3	N/A	2	10	40	40	760
4	N/A	4	8	40	40	960
5	N/A	4	16	40	40	480
6	1	5	8	20	20	480
7	2	2	16	20	20	240
8	3	4	8	40	10	240
9	4	2	4	80	10	480
10	5	4	4	80	20	960
11	6	2	2	160	20	1920
13	7	4	2	160	40	3840
15	8	2	1	320	40	7680

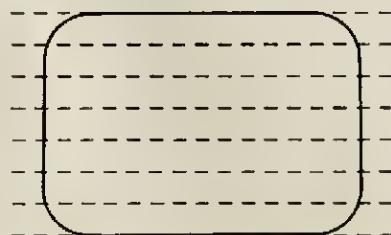
Table 3 LMS Instruction Format

INSTRUCTION	DESCRIPTION
66	Specifies LMS in BASIC mode 0
0	Low byte of hexadecimal \$600.
6	High byte of hexadecimal \$600.

Table 4 Basic Graphics Mode 2 Display List

ANTIC INST.	DESCRIPTION
112	Display 8 blank lines
112	Display 8 blank lines
112	Display 8 blank lines
71	LMS opcode: $64 + 7 = 71$ BASIC mode 2
0	LMS low byte < address of screen data
6	LMS high byte < $0 + 6 * 256 = 1536$ decimal
7	2nd BASIC graphics mode 2 instruction
7	3rd BASIC graphics mode 2 instruction
7	4th BASIC graphics mode 2 instruction
7	5th BASIC graphics mode 2 instruction
7	6th BASIC graphics mode 2 instruction
7	7th BASIC graphics mode 2 instruction
7	8th BASIC graphics mode 2 instruction
7	9th BASIC graphics mode 2 instruction
7	10th BASIC graphics mode 2 instruction
7	11th BASIC graphics mode 2 instruction
7	12th BASIC graphics mode 2 instruction
65	Jump to top of display list
92	Low byte < address of display list
158	High byte < $92 + 158 * 256 = 40540$ decimal

Figure A



The first step to developing a display list for a horizontal scroll screen is allocating space in RAM for the screen data. Remember, the total memory required is greater than a single screen display since the entire image to be scrolled must be stored in memory.

Suppose, for example, you wanted to scroll a BASIC graphic mode 2 screen, 256 bytes wide. Table 2 indicates that a BASIC 2 mode line requires 16 horizontal scan lines. Therefore, twelve mode lines can be stacked in one display ($16 \times 12 = 192$). Multiplying the number of mode lines by the length of the lines gives us the total RAM required: $12 \times 256 = 3,072$ bytes of RAM. Since the display line in graphic mode 2 is only 20 bytes wide, only 240 bytes will be displayed at a time ($12 \times 20 = 240$).

Figure C shows the example with screen data beginning at memory location 14,080, and ending at 17,151

($14,080 + 3,071 = 17,151$). Since there are 256 bytes allocated per mode line, the 20 byte wide display screen reveals only small sections of the screen data at a time depending on which part of the mode lines it is programmed to display.

An LMS 3-byte instruction is used to identify the mode and beginning screen data location for each line. In order to display the left edge of the screen data, the LMS instructions will identify memory location 14,080 to begin the first line, 14,336 ($14,080 + 256$) to begin the second line, and each successive line as listed on the left memory location column of Figure C. If, on the next display, the LMS location for each mode line is programmed to increment one byte, the screen data will appear to move to the left and reveal new data on screen right. And, if the LMS locations is incremented with each new display, 254 more times, the far right screen data will finally reach the left screen

edge, completing the scroll.

This entire process takes about 4.3 seconds since each display is 1/60th second in duration (256 displays divided by 60). The screen can be scrolled in the opposite direction by decrementing each LMS location. Table 5 illustrates a horizontal scroll display list for this example. Notice the LMS 3-byte instruction for every line, and the return to top of screen instruction at the end of the list.

Fine Scrolling

Horizontal scrolling as described thus far will produce a coarse scroll with a resolution the width of a single character. A fine scroll can be produced with the Atari by using the HSCROL byte (54276 decimal, \$D404 hexadecimal). There are two steps to implementing fine scrolling. First, enable the fine scroll bits for each mode line. This is accomplished by adding 16 to the LMS first byte (opcode) instruction. For example, the instruction for a BASIC graphics mode 2 display is normally 71, but for fine scrolling it is 87 ($64 + 7 + 16 = 87$).

The second step is to increment or decrement the HSCROL register (depending on the scroll direction). The amount that the image is incremented depends on the graphic mode. In BASIC graphic mode 0, a character is four "color-clocks" wide, so there are four steps to a graphic 0 fine scroll. Changing the HSCROL register from a 0 to a 1 will scroll a character one-quarter of its width. Changing it to a 3 in the

Figure B



Figure C 256 Byte Wide Horizontal Scroll

1		----- 256 BYTE MODE LINES -----		256
Location				Location
1	14080			14335
2	14336			14591
3	14592			14847
4	14848			15103
5	15104			15359
6	15360			15615
7	15616			15871
8	15872			16127
9	16128			16383
10	16384			16639
11	16640			16895
12	16896			17151

next display will scroll it another quarter-character for a total of one-half its width. Figure D illustrates a fine scroll in graphic 0 mode.

The larger BASIC graphics mode 2 characters are 8 "color-clocks" wide. In this mode, the HSCROL register would be incremented from 0 to 7 in eight steps. The limit of a fine horizontal scroll is sixteen "color-clocks." To continue the scroll, coarse scroll must be used to adjust the display to the next character position.

Description of Programs

Five demonstration programs are provided to illustrate horizontal scrolling.

PROGRAM ONE: displays on-screen the display list for any graphics mode. Just type the number of the display list you want to examine.

PROGRAM TWO: demonstrates coarse scrolling. The joystick can be used to horizontal scroll 4 mode lines of graphics 0. A portion of page 2 (512-768 decimal) is used as a background, and the display list is stored in page 6 (1536-1792 decimal).

PROGRAM THREE: demonstrates fine scrolling. The joystick can be used to horizontal scroll 8 color clocks (about 2 characters).

PROGRAM FOUR: is a combination of two and three. The joystick can be used to horizontal scroll a row of characters several bytes. The program uses HSCROL to fine scroll for a character length and coarse scroll to advance the display farther. To speedup data loading, the screen is momentarily turned off when the program is run.

PROGRAM FIVE: is a complete scrolling scene. The program uses graphics 2 and a modified character set to display an underground cavern. This program also turns off the screen during loading which takes about one minute. Because BASIC is too slow to keep up with the graphics, the screen will flicker while scrolling. This problem would be eliminated if the program were written in assembly language. **A**

This article, the first in a series on Atari's scrolling capabilities, will explain one aspect of scrolling: how to perform a horizontal scroll.

Figure D Fine Scroll

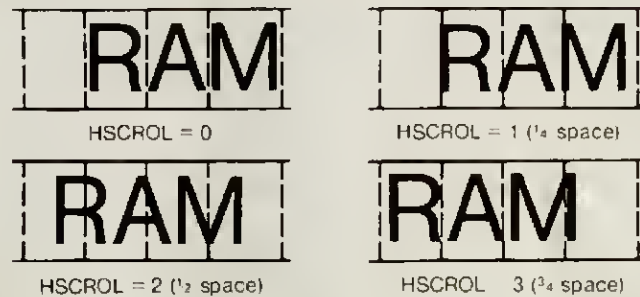


Table 5

ANTIC INST.	DESCRIPTION
112	8 blank lines
112	8 blank lines
112	8 blank lines
71	1st LMS opcode: (64 + 7 = 71) mode 2
0	LMS low byte < address of screen data
55	LMS high byte < 0 + 55 * 256 = 14080 decimal
71	2nd LMS opcode: BASIC graphics mode 2
0	LMS low byte < address of screen data
56	LMS high byte < 0 + 56 * 256 = 14336 decimal
71	3rd LMS opcode: BASIC graphics mode 2
0	LMS low byte < address of screen data
57	LMS high byte < 0 + 57 * 256 = 14592 decimal
71	4th LMS opcode: BASIC graphics mode 2
0	LMS low byte < address of screen data
58	LMS high byte < 0 + 58 * 256 = 14848 decimal
71	5th LMS opcode: BASIC graphics mode 2
0	LMS low byte < address of screen data
59	LMS high byte < 0 + 59 * 256 = 15104 decimal
71	6th LMS opcode: BASIC graphics mode 2
0	LMS low byte < address of screen data
60	LMS high byte < 0 + 60 * 256 = 15360 decimal
71	7th LMS opcode: BASIC graphics mode 2
0	LMS low byte < address of screen data
61	LMS high byte < 0 + 61 * 256 = 15616 decimal
71	8th LMS opcode: BASIC graphics mode 2
0	LMS low byte < address of screen data
62	LMS high byte < 0 + 62 * 256 = 15872 decimal
71	9th LMS opcode: BASIC graphics mode 2
0	LMS low byte < address of screen data
63	LMS high byte < 0 + 63 * 256 = 16128 decimal
71	10th LMS opcode: BASIC graphics mode 2
0	LMS low byte < address of screen data
64	LMS high byte < 0 + 64 * 256 = 16384 decimal
71	11th LMS opcode: BASIC graphics mode 2
0	LMS low byte < address of screen data
65	LMS high byte < 0 + 65 * 256 = 16640 decimal
71	12th LMS opcode: BASIC graphics mode 2
0	LMS low byte < address of screen data
66	LMS high byte < 0 + 66 * 256 = 16896 decimal
65	Jump to top of display list
92	Low byte < address of display list
158	High byte < 92 + 158 * 256 = 40540 decimal

Program 1

```
10 REM *****
20 REM *
30 REM * PRINT OUT DISPLAY LISTS *
35 REM *
48 REM * PROGRAM 1 *
45 REM *
50 REM *****
90 TRAP 138
100 DIM O(200)
120 ? "ENTER GRAPHICS MOOE TO EXAMINE"
130 INPUT G
140 GRAPHICS G
150 REM *DETERMINE OL STARTING ADDRESS
*
168 OL=PEEK(560)+PEEK(561)*256
170 REM * STORE OL IN AN ARRAY *
180 FOR A=0 TO 199
190 O(A)=PEEK(OL+A)
208 NEXT A
210 REM * PRINT ARRAY TO SCREEN *
220 GRAPHICS 0
225 POSITION 2,5
230 FOR A=0 TO 199
240 ? O(A);",":
250 NEXT A
```

```
605 REM *
690 POKE 1611,65:REM JVB code
788 POKE 1612,0:REM lo byte
710 POKE 1613,6:REM hi byte
720 REM *
725 REM * Set (OL) pointers *
730 REM *
740 POKE 568,0
750 POKE 561,6
760 REM *
770 REM * Joystick input *
775 REM *
780 ST=STICK(0)
798 IF ST=11 THEN S0=S0+1
800 IF ST=7 THEN S0=S0-1
810 IF S0<0 THEN S0=0
820 IF S0>255 THEN S0=255
830 REM *
835 REM * Adjust LMS instruction *
838 REM * with new setting *
840 REM *
850 FOR X=10 TO 15
860 POKE 1540+X*3,S0:REM LMS lo byte
870 NEXT X
880 REM *
900 GOTO 700
```

Program 2

```
10 REM *****
28 REM *
30 REM * COARSE HORIZONTAL SCROLL *
35 REM *
38 REM * PROGRAM 2 *
39 REM *
40 REM * Use STICK(8) to scroll *
45 REM *
50 REM *****
100 S0=8
490 REM * 24 blank lines at the top *
495 REM * of the screen *
497 REM *
508 POKE 1536,112:REM 0 blank
518 POKE 1537,112:REM 0 blank
520 POKE 1530,112:REM 0 blank
530 REM *
548 REM *give every mode line a LMS *
545 REM * instruction *
547 REM
550 FOR X=0 TO 23
560 POKE 1539+X*3,66:REM LMS code
588 POKE 1540+X*3,8:REM lo byte
590 POKE 1541+X*3,2:REM hi byte
608 NEXT X
618 REM *
620 REM *
668 REM * Adjust JVB instruction *
670 REM * Display List starts at *
680 REM * $608 *
```

Program 3

```
100 REM *****
110 REM *
120 REM * 2 BYTE FINE SCROLL *
130 REM *
140 REM * PROGRAM 3 *
158 REM *
160 REM *****
170 S0=0:REM M5CROL input
180 GRAPHICS 8
198 POKE 752,1
208 POSITION 3,2
210 ? "2 Byte FINE SCROLL 0-255"
220 POSITION 10,15
238 ? "The scroll is accomplished
through the use of H5CROL
(54276 dec)"
240 POSITION 12,8
250 ? "Use STICK(8) to scroll"
260 POSITION 12,12
278 ? "H5CROL value: "
280 REM *
290 REM * Find starting address of *
300 REM * Display List *
310 REM *
320 OL=PEEK(568)+256*PEEK(561)
330 REM *
340 REM * Enable horizontal scroll *
350 REM * on display list byte 13 *
360 REM *GR.0: 2+(horz scroll)16=18 *
370 REM *
380 POKE OL+13,18
```

```

390 REM *
400 REM * STICK(0) input *
410 REM *
420 ST=STICK(0)
430 IF ST=7 THEN SD=SD+1
440 IF ST=11 THEN SD=SD-1
450 IF SD<0 THEN SD=0
460 IF SD>7 THEN SD=7
470 REM *
480 REM * Cause fine scroll (HSCROL)*
490 REM *
500 POKE 54276,SD
510 POSITION 26,12
520 ? SD
530 GOTO 420

```

Program 4

```

100 REM *****
120 REM * *
140 REM * FINE SCROLLING LINE *
160 REM * *
180 REM * PROGRAM 4 *
200 REM * *
220 REM *****
230 REM * turn of the screen *
240 POKE 559,0
245 REM *
250 REM * load top half of the *
252 REM * screen with "5" *
255 REM *
260 FOR X=12288 TO 12607
280 POKE K,250
300 NEXT K
305 REM *
310 REM * Print random data on the *
312 REM * line that is be scrolled*
315 REM *
320 FOR X=0 TO 255
340 Y=INT(RND(0)*256)
360 IF Y=155 THEN Y=0
380 POKE 15072+K,Y
400 NEXT X
405 REM *
410 REM * Draw the lower portion *
412 REM * of the screen with data *
414 REM * from addr. 14000 dec. *
415 REM *
420 POKE 08,0
440 POKE 09,55
445 REM *
448 REM * Turn off the cursor *
450 POKE 752,1
455 REM * Print to the lower screen *
460 POSITION 12,2

```

```

480 ? "FINE SCROLLING"
500 POSITION 1,4
520 ? "Use STICK(0) to scroll the line
above"
540 POSITION 0,7
560 ? "LMS 10 byte : "
580 POSITION 8,9
600 ? "HSCROL(54276): "
620 SB=100
625 REM *
630 REM * store new display list at *
632 REM * in PAGE 6 (1536 dec.) *
635 REM *
640 FOR X=1 TO 35
660 READ 0
680 POKE 1536-1+X,0
700 NEXT X
710 REM *
720 REM * Set DL pointers to PAGE 6 *
730 REM *
740 POKE 560,0
760 POKE 561,6
765 REM *
770 REM * Turn-on the screen *
780 POKE 559,34
800 ST=STICK(0)
805 REM *
810 REM * Inputer STICK(0) data *
815 REM *
820 IF ST=7 THEN H5=H5+1
840 IF ST=11 THEN H5=H5-1
860 IF H5<0 THEN H5=3:SB=SB+1:GOTO 102
0
880 IF H5>3 THEN H5=0:SB=SB-1:GOTO 102
0
895 REM *
898 REM * Change the HSCROL setting *
899 REM *
900 POKE 54276,H5
920 POSITION 25,9
940 ? H5
960 GOTO 800
990 REM *
998 REM *
1020 IF SB<0 THEN SB=0
1040 IF SB>255 THEN SB=255
1060 REM *
1080 REM * Change the LMS 10 byte *
1100 REM *
1120 POKE 1536+14,SB
1140 POKE 54276,H5
1160 POSITION 25,7
1180 ? SB;" "
1200 POSITION 25,9
1220 ? H5
1240 GOTO 800
1245 REM *
1250 REM * New display list *
1255 REM *
1260 DATA 112,112,112,66,0,40,2,2,2,2,
2,2,2,82,100,62,66,0,55,2,2,2,2,2,2,
2,2,2,2,2,2,65,0,6

```


Program 5

```
10 REM *****
20 REM *
30 REM * H0RZ SCR0LL 0ISPLAY *
40 REM *
50 REM *      PROGRAM 5      *
60 REM *
70 REM *****
80 REM *
90 REM * Move character set *
100 REM *
110 NSET=(PEEK(106)-4)*256
120 POKE 106,PEEK(106)-5:GRAPHICS 0:PO
SITION 10,5:? "Please Wait 1:20 min"
130 FOR L=1 TO 1024:POKE NSET+L-1,PEEK
(57344+L-1):NEXT L
140 POKE 756,NSET/256
150 FOR L1=1 TO 16:REM 16
160 READ L0C
170 SET=NSET+L0C*8
180 FOR L2=0 TO 7:READ D
190 POKE SET+L2,D
200 NEXT L2
210 NEXT L1
220 REM * get screen data *
230 GOTO 530
240 REM *
250 REM * Scroll the screen *
260 REM *
270 S8=1:H5=0
280 RESTORE 930
290 FOR X=1 TO 42
300 READ 0
310 POKE 1536-1+X,D
320 NEXT X
330 POKE 560,0
340 POKE 561,6
350 ST=STICK(0)
360 POKE 77,0
370 IF ST=7 THEN H5=H5-1
380 IF ST=11 THEN H5=H5+1
390 IF H5<0 THEN H5=7:S8=S8+1:GOTO 430
400 IF H5>7 THEN H5=0:S8=S8-1:GOTO 430
410 POKE 54276,H5
420 GOTO 350
430 IF S8<0 THEN S8=0
440 IF S8>233 THEN S8=233
450 POKE 54276,H5
460 FOR X=1 TO 11
470 POKE 1540+X*3,S8
480 NEXT X
490 GOTO 350
500 REM *
510 REM * storing screen data *
520 REM *
530 RESTORE 960
540 FOR X=1 TO 20
550 READ 0
560 POKE 12288+X-1,D
570 NEXT X
580 RESTORE 970
590 C=1:LL=0
600 READ A,8
610 REM * END OF LINE *
620 IF A=1 AND 8=0 THEN C=C+1:LL=0:GOT
O 600
630 REM * END OF DATA *
640 IF A=0 AND 8=0 THEN 700
650 FOR X=1 TO 8
660 POKE 12288+C*256+X-1+LL,A
670 NEXT X
680 LL=LL+8
690 GOTO 600
700 REM
710 GOTO 270
720 REM *
730 REM * 0ata
740 REM *
750 REM * Character data *
760 DATA 1,255,255,255,251,179,163,1,0
770 0ATA 2,255,255,255,255,255,255,255
,255
780 DATA 3,0,1,163,179,251,255,255,255
790 DATA 4,127,63,15,15,63,7,31,127
800 DATA 5,255,254,248,224,248,254,248
,252
810 DATA 6,255,127,63,63,47,7,5,1
820 DATA 7,255,254,254,250,232,232,128
,128
830 DATA 8,128,160,176,244,252,254,254
,255
840 DATA 9,1,11,15,15,95,95,127,255
850 DATA 10,255,195,165,153,153,165,19
5,255
860 DATA 11,8,127,8,127,8,8,8,8
870 DATA 12,8,73,107,62,8,8,28,62
880 0ATA 13,62,28,8,28,62,127,73,8
890 0ATA 14,0,0,0,24,60,102,231,231
900 0ATA 15,224,240,120,92,78,71,79,12
7
910 DATA 16,127,79,71,78,92,120,240,22
4
920 REM * DISPLAY LIST *
930 DATA 112,112,112,71,0,48,87,0,49,8
7,0,50,87,0,51,87,0,52,87,0,53,87,0,54
,87,0,55,87,0,56,87,0,57
940 0ATA 87,0,58,87,0,59,65,0,6
950 REM * Screen data *
960 0ATA 0,40,47,50,41,58,47,46,52,33,
44,0,51,35,50,47,44,44,0,0
970 DATA 1,15,2,18,1,25,2,21,1,59,2,6,
1,15,2,19,1,21,2,21,1,24,2,11,1,0
980 0ATA 0,15,6,1,2,16,7,1,0,25,4,1,2,
19,7,1,0,59,6,1,2,4,7,1,0,15,6,1,2,17,
7,1,0,21,6,1,2,19,5,1
990 DATA 0,24,4,1,2,10,1,0
1000 DATA 0,16,6,1,2,14,7,1,0,26,4,1,2
,18,7,1,0,61,6,1,2,2,7,1
1010 DATA 0,17,6,1,2,15,7,1,0,23,6,1,2
,18,5,1,0,24,4,1,2,10,1,0
1020 DATA 0,17,6,1,1,12,7,1,0,27,6,1,2
,17,7,1,0,7,9,1,3,47,8,1
1030 0ATA 0,7,6,1,7,1,0,19,6,1,1,4,2,3
,1,6,7,1,0,9,9,1,3,5,8,1,0,9
1040 0ATA 6,1,1,7,2,10,7,1,0,8,9,1,3,6
```

```
,8,1,0,8,6,1,2,10,1,0
1050 DATA 0,39,9,1,3,8,8,1,0,10,6,1,2,
7,7,1,1,7,7,1,0,7,9,1,2,22,1,15
1060 DATA 2,12,8,1,0,14,9,1,3,6,8,1,0,
10,6,1,1,1,7,1,0,15,9,1,2,7,8,1,0,16,6
,1
1070 DATA 2,8,7,1,0,9,4,1,2,6,5,1,0,9,
6,1,1,9,1,0
1080 DATA 0,38,9,1,2,9,5,1,0,11,6,1,1,
5,7,1,0,16,6,1,1,8,2,13,7,1,0,15,6,1
1090 DATA 2,12,0,1,0,13,6,1,2,7,8,1,0,
26,9,1,2,9,8,1
1100 DATA 0,16,6,1,1,6,7,1,0,10,4,1,2,
6,5,1,0,10,0,1,0,6,10,1,0,1,1,0
1110 DATA 0,37,9,1,2,10,5,1,0,43,6,1,2
,11,7,1,0,17,6,1,2,11,7,1,0,14
1120 DATA 6,1,2,7,8,1,0,24,9,1,2,11,8,
1,0,33,4,1,2,6,5,1,0,17,10,1,0,1,1,0
```

```
1130 DATA 0,17,9,1,3,19,2,12,8,1,0,43,
6,1,1,9,7,1,0,19,6,1,1,9,7,1,0,8,9,1,8
,1
1140 DATA 0,6,6,1,1,7,0,23,9,1,2,13,8,
1,0,32,4,1,2,6,5,1,0,17,10,1,1,0
1150 DATA 0,16,9,1,2,33,8,1,0,24,9,1,3
,3,8,1,0,30,9,1,3,5,8,1,0,24,9,1,2,2,8
,1
1160 DATA 0,25,9,1,3,10,2,15,3,6,8,1,0
,24,12,1,4,1,2,7,8,1,0,16,10,1,1,0
1170 DATA 0,15,9,1,2,35,8,1,0,20,9,1,3
,2,2,5,3,4,8,1,0,24,9,1,2,7,8,1,0,22
1180 DATA 9,1,2,4,8,1,0,19,9,1,3,4,2,3
3,3,3,8,1,0,19,9,1,2,10,8,1,0,15,10,1,
1,0
1190 DATA 3,15,2,37,3,20,2,13,3,24,2,9
,3,22,2,6,3,19,2,42,3,19,2,12,3,15,10,
1,0,0
```

How Not to Sit Around Waiting for I/O

by J. Rob Wall

If you do your own programming, and use BASIC'S PUT and GET statements, you know that waiting for the disk (or cassette) can be a major task. The slowest part of computing is sitting around waiting for input and output.

Now suppose someone says he will show you a way to increase the speed of PUT/GET disk operations by up to 1100% and cassette drives by up to 300%; what would you say? How much does it cost? Is soldering required? Well, you don't have to worry about anything like that. The only thing you have to do is read the next few pages and type in two example programs—no money! no soldering!

The key to this is learning how to communicate with your drive, using the ATARI's CIO. This article contains four listings: One is a subroutine that can be inserted in to your programs to access the CIO, one is a program that allows modification of data already in ROM, one moves data from ROM to RAM, and one saves a graphics screen.

A Description of the CIO

CIO stands for Central Input/Output. The CIO is a machine language subroutine located in the Operating System's ROM. Its purpose is to send I/O control information to a device handler and then to pass control to it. Being machine language, the CIO is extremely fast. In time, you may find it even more convenient to use than BASIC's own PUT any GET commands.

The Importance of Understanding the CIO

The main reason for learning how to use the CIO is to increase the speed with which data can be transferred. With the time needed to access your storage device decreased in this way, many new possibilities are presented for your programs. With CIO, you can save and load alternate character sets, hi-res graphics screens, display lists, player missile graphics data, machine

language programs, and anything else with a large amount of data, in a matter of seconds. Obviously, cassette users will not be able to match these speeds, but I'm sure that they will notice a significant difference. It's not difficult to imagine the enhancements that can be added to your work!

The Mechanics of Using the CIO

The CIO needs to be told only 4 pieces of information.

- (1) which IOCB to use
- (2) whether it is to READ or WRITE
- (3) the address in memory where it is to get data from, and to put data to
- (4) how many bytes to transfer

Using the subroutine shown in listing 1, this information is transferred via a machine language command to the CIO, which handles the data transfer.

And that's it! The rest of this article explains what the above steps mean, and gives a listing for a subroutine to handle CIO operations.

The IOCB

IOCB stands for Input/Output Control Block. Think of the IOCB's as channels into and out of the Atari, or between devices. The IOCBs are 16 byte areas in memory which specify what operation to perform, how much data to transfer, and whether to send or to retrieve information. Your disk and cassette drives, printer, and even your screen display are all controlled via an IOCB.

Many commands such as LOAD, SAVE, ENTER, LIST, and LPRINT use some of the IOCBs. These commands automatically format the IOCBs to suit their needs.

Some of the IOCBs are already reserved for use by your ATARI:

(a) IOCB #0 (832-847)—This IOCB controls all the text in GRAPHICS0 and in the text windows in split-screen modes. You shouldn't use this IOCB for disk/cassette operations.

(b) IOCB #1-5 (848-863), (864-879) (880-895), (896-911), (912-927)—These IOCB are free for use.

(c) IOCB #6 (923-943)—This IOCB supports all the GRAPHICS modes other than mode 0. Every time you type PRINT #6; PLOT xx, yy; DRAWTO xx,yy; or use the XIO FILL command; you are using IOCB #6.

(d) IOCB #7 (944-959)—This IOCB is employed by the LPRINT command. Because this command is rarely used, it is often free for you to manipulate.

IOCB 6 and IOCB #7 can be used as long as other commands in your program will not conflict with them. Generally, there is no need to use these I/O Control Blocks because IOCB #1 through IOCB #5 are always free.

The IOCB Bytes

As mentioned earlier, the IOCB consists of a 16 byte block. Controlling how data is to be transferred, each one of these bytes performs a particular func-

tion. Figure 1 is a list of all the IOCB bytes, including their label, their position within the Control Block, and a brief explanation of their purpose.

Controlling the CIO

Although most of the IOCB bytes have a purpose, for most applications we are chiefly concerned with ICCOM, ICBAL/H, ICBLH/H, ICAX1. Below is a more thorough description of these 4 bytes.

ICCOM—This, the third byte in an IOCB, tells the device whether to READ or WRITE. In this byte, a value of 7 indicates a READ, an 11 indicates a WRITE. Do not confuse ICCOM with ICAX1!

ICBAL/H—These two bytes (in LSB/MSB) point to an address used for data transfer. For example, if we are to READ, these bytes point to the destination of the data, if we are to WRITE, they point to the source of the data.

ICBLH/H—These two bytes, also in LSB/MSB, store the buffer length (the number of bytes to be transferred). Being updated after each READ or WRITE operations, this address decrements every time a byte is transferred.

ICAX1—This byte is equivalent to the first auxiliary byte in your OPEN command (AUX1). A value of 4 indicates a READ, whereas a value of 8 indicates a WRITE. The computer takes care of this byte automatically, so we don't have to POKE anything here. We merely PEEK this byte so that we can POKE the appropriate number (7 or 11) into ICCOM.

Listing 1 is a subroutine written in BASIC that will take care of all the mundane activities such as breaking down numbers into LSB/MSB, and POKEing them in the correct locations. Not being a complete program in itself, it must be merged with another. To use this subroutine in your own programs, you must do five things:

1. Put the IOCB number into the variable: IO
2. OPEN a file for either READ or WRITE
3. Put the address of where the data is to go to or come from into the variable: ADRES
4. Put the buffer length (number of bytes to transfer) into the variable: BYTES
5. GOSUB 29000

A line by line breakdown of Listing 1 follows.

Figure 1

LABEL	OFFSET	BYTES	DESCRIPTION
ICHID	0	1	Index into device name table of currently OPENed file. Set by O.S.
ICDNO	1	1	Device number. Indicates which drive to use. Set by O.S.
ICCOM	2	1	(Also called ICCMD.) Determines type of action to be taken by the device. Set by user.
ICSTA	3	1	Status returned by device. Any number over 128 indicates an error. For assembly programmers this number is also returned to the 'Y' register. Set by O.S.
ICBAL/H	4/5	2	Two byte buffer address.
ICPTL/H	6/7	2	Address (minus one) of the devices put-byte routine.
ICBLH/H	8/9	2	The length of the transfer buffer. (LSB/MSB)
ICAX1	10	1	First auxiliary byte. Specifies the type of file access. Not to be confused with ICCOM.
ICAX2	11	1	Second auxiliary byte used in OPEN command. Set to zero for disk, 128 for cassette.
ICAX3/4	12/13	2	Third/fourth auxiliary bytes. Used to keep track of sector for NOTE/POINT. (LSB/MSB)
ICAX5	14	1	Fifth auxiliary byte. Used to keep track of byte within a sector for NOTE/POINT.
ICAX6	15	1	Sixth auxiliary byte. Unused.

29020—Finds the address of the IOCB and stores it into the variable IOCB.

29030—Finds the addresses of ICCOM, ICBAL/H.

29040—Finds the addresses of ICBLH/H; ICAX1.

29070—If ICAX1 is equal to 4 (READ), POKE ICCOM with 7. If ICAX1 is equal to 8 (WRITE), POKE ICCOM with 11.

29080—Calculates the LSB and the MSB of the variable ADRES and stores them into ADRL and ADRH respectively.

29090—Calculates the LSB and the MSB of the variable BYTES and stores them into BYTEL and BYTEH respectively.

29100—POKEs the LSB of ADRES into ICBAL and the MSB into ICBAH. This gives the computer the address of where the information is to be written to or retrieved from.

29110—POKEs the LSB of BYTES into ICBLH and the MSB into ICBLH. This gives the computer the number of bytes that are to be transferred.

29120—This is a short machine language routine which transfers control to the CIOV (CIO Vector). The CIOV contains the instruction JMP SE4C4 which jumps to the CIO. The reason that CIOV is used instead of JUMPing directly to the CIO is to keep your programs compatible with any future ATARI OS upgrades. Although the location of the CIO could change, it would remain compatible if the CIOV pointed to this new location. The following display is a breakdown of the USR call:

DECIMAL: 104, 104, 104, 170, 76, 86, 228

HEX: \$68, \$68, \$68, \$AA, \$4C, \$56, \$E4

A line by line breakdown of Listing 1 follows.

29020—Finds the address of the IOCB and stores it into the variable IOCB.

29030—Finds the addresses of ICCOM, ICBAL/H.

29040—Finds the addresses of ICBLH/H; ICAX1.

29070—If ICAX1 is equal to 4 (READ), POKE ICCOM with 7. If ICAX1 is equal to 8 (WRITE), POKE ICCOM with 11.

29080—Calculates the LSB and the MSB of the variable ADRES and stores them into ADRL and ADRH respectively.

29090—Calculates the LSB and the MSB of the variable BYTES and stores them into BYTEL and BYTEH respectively.

29100—POKEs the LSB of ADRES into ICBAL and the MSB into ICBAH. This gives the computer the address of where the information is to be written to or retrieved from.

29110—POKEs the LSB of BYTES into ICBLH and the MSB into ICBLH. This gives the computer the number of bytes that are to be transferred.

29120—This is a short machine language routine which transfers control to the CIOV (CIO Vector). The CIOV contains the instruction JMP SE4C4 which jumps to the CIO. The reason that CIOV is used instead of JUMPing directly to the CIO is to keep your programs compatible with any future ATARI OS upgrades. Although the location of the CIO could change, it would remain compatible if the CIOV pointed to this new location. The following display is a breakdown of the USR call:

DECIMAL: 104, 104, 104, 170, 76, 86, 228

HEX: \$68, \$68, \$68, \$AA, \$4C, \$56, \$E4

OP	OPRND	COMMENTS
PLA		;clear # arguments
		off stack
PLA		;MSB of IO*16 discard!
PLA		;LSB of IO*16
TAX		;transfer LSB to X register
JMP	\$E456	;jump to CIOV in jump table

The ATARI expects to find the LSB of

the IOCB address in the 'X' register when control is passed to the CIOV. Because of this, a TAX command is given so that the contents of the Accumulator are transferred to the 'X' register.

29130—CLOSE the IOCB channel.

29140—RETURN to your BASIC program.

The Limitations of the CIO

There is one restriction in using the CIO. This concerns modifications of files in ROM. You can not save directly to disk or cassette any ROM—either O.S. or cartridge.

The main drawback of not being able to store ROM is that the character set can't be directly saved. To get around this problem, you will have to move the set to RAM before it can be stored on disk. Because using BASIC to store the character set is time consuming, Listing 2 includes a machine language routine to do this almost instantaneously.

Soon after starting, Listing 2 will ask if you use a disk or cassette drive. Type '0' to indicate a disk, or type '1' to indicate a cassette. The program will then set up a protected 2K block of RAM for storing the character set. A machine language routine will accomplish this in about 1/10th of a second.

To use this routine in your own pro-

CONTINUED ON PAGE 66

Listing 1

```

29000 REM ...
29010 REM
29020 IOCB=B32+IO*16
29030 ICCOM=IOCB+2:ICBAL=IOCB+4:ICBAH=
IOCB+5
29040 ICBLH=IOCB+8:ICBLH=IOCB+9:ICAX1=
IOCB+10
29050 REM ...
29060 REM ...
29070 POKE ICCOM,7+4*(PEEK(ICAX1)=8)
29080 ADRH=INT(ADRES/256):ADRL=ADRES-A
DRH*256
29090 BYTEH=INT(BYTES/256):BYTEL=BYTES
-BYTEH*256
29100 POKE ICBAL,ADRL:POKE ICBAH,ADRH
29110 POKE ICBLH,BYTEH:POKE ICBLH,BYTE
H
29120 CIO=USR(ADR('hhhLUV'),IO*16)
29130 CLOSE #IO
29140 RETURN
    
```


Player Missile Graphics

by Eric Ly

If you are an Atari LOGO user, you probably already know how easy it is to program player/missile (P/M) graphics on LOGO. It is the easiest language for P/M graphics because the method is built right into the language, and there is no need for setting aside memory and other nuisances encountered with other languages. If you are not already familiar with player/missile graphics in Atari LOGO, refer to the manual supplied with the cartridge for basic instructions.

One of the many fine points of LOGO—and why it appeals to so many young people—is the ability to generate fantastic graphics with relatively short, simple code. In addition, Atari LOGO can produce animation with P/M graphics while retaining the original concept of the language: power with simplicity. However, because Atari LOGO is the first version of LOGO to have animation capability, it has not been fully explored.

Atari LOGO can hold 15 different shapes, which can be used to redefine the four independent turtles. Instead of displaying the turtles in the shape of turtles you can substitute another shape. You can, for example, design the frames of an object that one wants to animate and then display the shapes in sequence by using the SETSHape command. If you want to be able to move the turtle, use the SETSPeed command. SETSP can move turtles fairly smoothly at speeds ranging from 0 to 199, from crawling to dashing about during vertical blank.

Listing 1, called CITY, is a program that demonstrates the capabilities of Atari LOGO. Type it in and see what I mean. CITY draws an urban scene with several buildings, and stars in the background. One turtle takes the shape of a

car and travels across the screen, while another turtle becomes a plane and flies among the stars. What is most interesting about this program is two animated turtles in the form of joggers, using four different shapes or frames (stored in shapes no. 1 through no. 4). While the two turtles move across the screen by the SETSP command, the procedure ANIMATE cycles through the shapes in order and then in reverse order, creating the effect of a jogging back and forth motion. This way you can take a shortcut the professional animators use: Don't create shapes for each step of the animating sequence; just figure out where the shapes are the same and use them over again. That way, you save memory for more shapes or for any other purpose. Just be sure to edit your shapes carefully.

Notice how LOGO allows the stacking of procedures on top of one another and allows you to build new procedures out of old ones: The procedure BUILDING paints strips of dots on the screen to create the background. BUILDINGS generates random dimensions for the buildings and calls on BUILDING to draw them. BUILDINGS is called on by the procedure BACKGROUND, which in turn is called by the main routine CITY.

Look in the procedure CAR for the command .DEPOSIT, which works the same way as POKE does in BASIC. .DEPOSIT stretches the car to twice its length. This is probably the only thing which is not built into Atari LOGO and has to be accessed by a POKE.

CITY uses six shapes in total, four for the joggers, one for the plane, and the

Listing 1

Program: CITY

```
TO CITY
CS FS
TELL [0 1 2 3] HT PENUP
BACKGROUND
TELL [0 1 2 3] ST
CAR
PLANE
RUNNERS
ANIMATE
END
```

```
TO RUNNERS
PUTSH 1 :SH1
PUTSH 2 :SH2
PUTSH 3 :SH3
PUTSH 4 :SH4
TELL [0 1] PENUP
SETPOS [-158 -70]
```

```
SETH 90
TELL 0 SETSP 25
TELL 1 SETSP 30
TELL [0 1]
END
```

```
TO PLANE
PUTSH 6 :AIR
TELL 3 SETSH 4
SETPOS [-158 100]
SETH 270
SETSP 199
END
```

```
TO CAR
PUTSH 5 :AUTO
TELL 2 SETSH 5
.DEPOSIT 53258 1
SETPOS [160 -90]
SETH 90
```

Listing 1, continued

```
SETSP 100  
END
```

```
TO BACKGROUND  
TELL 0  
COLORS  
STARS  
PENUP SETPOS [-158 -69]  
PENDOWN  
BUILDINGS  
PENUP SETPOS [-158 -72]  
PENDOWN  
SIDEWALK  
PENUP SETPOS [-158 -73]  
PENDOWN  
SIDEWALK  
END
```

```
TO ANIMATE  
MAKE "S 1  
REPEAT 4 [SETSH :S MAKE "S :S + 1 WAIT 2]  
MAKE "S 3  
REPEAT 3 [SETSH :S MAKE "S :S - 1 WAIT 2]  
ANIMATE  
END
```

```
TO SIDEWALK  
SETH 90  
FD 320  
END
```

```
TO BUILDING :TALL :WIDE :COLOR  
SETPN :COLOR  
REPEAT :WIDE [FD :TALL SETX XCOR + 1 BK :TALL SETX XCOR + 1 IF XCOR =  
158 [STOP]]  
SETH 0  
END
```

```
TO BUILDINGS  
BUILDING ( RANDOM 80 ) + 80 ( RANDOM 20 ) + 5 RANDOM 3  
IF XCOR < 158 [BUILDINGS]  
END
```

```
TO COLORS  
SETBG 73  
SETPC 0 67  
SETPC 1 68  
SETPC 2 69  
END
```

```
TO STARS  
SETPN 2  
REPEAT 20 [PENUP SETPOS SE ( ( RANDOM 320 ) - 170 ) ( ( RANDOM 75 ) +  
40 ) PENDOWN FD 0]  
END
```

```
MAKE "SH4 [0 24 56 60 24 24 24 28 28 24 24 24 24 24 16]  
MAKE "SH3 [0 24 56 60 24 24 56 56 60 24 24 20 20 36 72 8]  
MAKE "SH2 [0 24 56 60 24 24 56 88 74 24 24 20 162 66 4 4]  
MAKE "SH1 [0 24 56 60 24 88 186 30 28 24 24 20 162 66 4 4]  
MAKE "AIR [0 0 6 12 25 51 127 255 48 24 12 6 0 0 0 0]  
MAKE "AUTO [0 0 0 0 0 56 84 84 255 255 255 170 68 0 0 0]  
MAKE "S 2
```


last for the car. These shapes are stored in variables which can be saved with the program. And later, when the program is loaded back into memory, the data can be POKEd back into the shape tables. CITY shows how simple it is to utilize P/M graphics in LOGO. You can save and load shapes easily, and you can create animation simply by flipping through these stored images.

I have written some procedures to make the task of creating shapes in Atari LOGO even faster and easier. These eleven procedures will make your programming with LOGO much more satisfying.

If you want to use a procedure, just type it in as you would any other procedure and save it to disk. Later, you can load the saved procedures when you begin work with shapes in LOGO. All of my procedures for working with shapes end with SH, like commands already in the language, such as EDSH, SETSH, GETSH, and PUTSH.

The Procedures: RESET—When I first worked with P/M graphics in LOGO, I discovered that I frequently had to change the turtles back to their original state before proceeding, and it was troublesome to type in commands to do this. So I wrote RESET to do it without typing a whole bunch of commands. This procedure will change all the colors, including background, back to their original colors. It also returns all of the turtles' shapes back into the original turtle shape. RESET will not erase any shapes or procedures in memory. This routine is useful when you want to start with a fresh screen, but don't want to ruin the contents of your computer's memory as you would by pressing SYSTEM RESET. No parameters are needed.

DNSH shpno.—This will move the contents of a shape down one pixel, and whatever's on the bottom of the shape is moved to the top. You must specify which shape to move by its number (1-15). For example, if you want to move your shape #1 down to add something on top, you would use DNSH 1.

UPSH shpno.—UPSH is the opposite of DNSH. It moves an image up one pixel.

COPYSH frshp toshp—COPYSH allows you to copy one shape into another shape. Whatever is in the destination shape will be written over. For example, COPYSH 1 2 would put the data from shape #1 into shape #2.

SWAPSH shp1 shp2—This procedure will switch the data in two specified shapes. For example, SWAPSH 10 2 will place all of the data of shape 10 into shape 2, and vice versa.


MOVESH spd shps—MOVESH opens up the use of animation in LOGO. After you have designed the frames of the object you want to move, all you have to do is to give the shape numbers to MOVESH, and MOVESH will cycle through the shapes you want, changing the shape of the active turtle, one shape right after another until the list is completed. MOVESH 3 [4 2 6 1] will cycle through shapes 4, 2, 6, and 1 in that order, pausing 3/60ths of a second during each change.

ERSH shpno.—LOGO has commands for erasing all of its kinds of data structures, except shapes. ERSH clears the shape you want. You can specify just one shape, by number, or you can give a whole bunch of shapes. Put a group in list form, such as ERSH [10 9 8 1].

ALLSH—This does nothing by itself. ALLSH simply outputs all the shape numbers; when you want to do something to all the shapes, you don't have to type out all the numbers. The combination ERSH ALLSH will erase all of the shapes, letting you start with a clean slate.

USE turno. cmd—When you just want to change the color a turtle you aren't "talking" to at the moment, you must TELL him, set his color, and TELL back to the other turtle that you were talking to before. If you've ever had this tedious problem, USE is for you. USE will let you leave the turtle that you are currently talking to, go to another turtle, do something with that turtle, and go back to your original turtle. For instance, say you are talking to turtle 0, and you want to set the speed (SETSP) of turtle 1, just enter USE 1 [SETSP 101]. Turtle 0 will not be disturbed at all, and you save yourself a lot of typing.

PRSH shpno.—PRSH will print out on the screen the data in the designated shape. You can also dump the shapes to a printer by using SETWRITE "P: PRSH 1 SETWRITE []. And again, you can print out all the shapes simply by typing PRSH ALLSH. A procedure called BITS is used by PRSH to convert the data given by GETSH into a binary form for printing.

Although there are many more procedures that could be written for P/M in LOGO, these are the backbones of more complicated procedures. Feel free to change them to suit your tastes. I hope these procedures will help your work with P/M graphics in LOGO. Happy LOGOing! 

Helpful Procedures

```

TO RESET
SETBG 74
SETPC 0 15
SETPC 1 47
SETPC 2 121
SETPN 0
USE 0 [SETC 7]
USE 1 [SETC 20]
USE 2 [SETC 44]
USE 3 [SETC 68]
.DEPOSIT 53256 0
.DEPOSIT 53257 0
.DEPOSIT 53258 0
.DEPOSIT 53259 0
USE ALL [SETSH 0 SETSP 0 CS PD]
TELL 0 ST
END

```

```

TO DNSH :SHP
PUTSH :SHP ( SE LAST GETSH :SHP BL GETSH :SHP )
END

```

```

TO UPSH :SHP

```

Helpful Procedures, continued

```
PUTSH :SHP ( SE BF GETSH :SHP FIRST GETSH :SHP )
END
```

```
TO COPYSH :FROM :TO
PUTSH :TO GETSH :FROM
END
```

```
TO SWAPSH :SH1 :SH2
MAKE "DAT GETSH :SH1
PUTSH :SH1 GETSH :SH2
PUTSH :SH2 :DAT
ERN "DAT
END
```

```
TO MOVESH :SPD :SHP
IF EMPTY :SHP [STOP]
IF WORDP :SHP [SETSH :SHP STOP]
SETSH FIRST :SHP
WAIT :SPD
MOVESH :SPD BF :SHP
END
```

```
TO ERSH :SHP
MAKE "DAT [0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
IF EMPTY :SHP [ERN "DAT STOP]
IF LISTP :SHP [PUTSH FIRST :SHP :DAT ERSH BF :SHP] [PUTSH :SHP :DAT ERN
"DAT]
END
```

```
TO ALLSH
OP [1 2 3 4 5 6 7 8 9 10 11 12 13 14 15]
END
```

```
TO USE :TURTLE :COMMAND
MAKE "ACT WHO
TELL :TURTLE
RUN :COMMAND
TELL :ACT
ERN "ACT
END
```

```
TO ALL
OP [0 1 2 3]
END
```

```
TO PRSH :SHP
IF EMPTY :SHP [ERN [DAT BIN] STOP]
PR "
TYPE SE "SHAPE "
IF EMPTY :SHP [ERN [DAT BIN] STOP]
IF LISTP :SHP [MAKE "DAT GETSH FIRST :SHP PR FIRST :SHP] [MAKE "DAT
GETSH :SHP PR :SHP]
REPEAT 16 [PR SE ( BITS FIRST :DAT ) ( FIRST :DAT ) MAKE "DAT BF :DAT]
IF LISTP :SHP [PRSH BF :SHP]
ERN [DAT BIN]
END
```

```
TO BITS :BYTE
MAKE "BIN []
REPEAT B [MAKE "BYTE :BYTE * 2 IF :BYTE > 255 [MAKE "BIN SE :BIN "
MAKE "BYTE :BYTE - 256] [MAKE "BIN SE :BIN ".]]
OP :BIN
END
```


ST Graphics

CONTINUED FROM PAGE 6

```
END
TO SQUIRAL
CS
DO.SQUIRAL 2
END
```

While this program is running you can move the mouse until the arrow points to one of the drop-down menus on top of the screen. This makes the program freeze until you do something. From the menu "settings" select choice "Graphics". A dialog box appears offering you several choices.

Among them are the ability to change the line's colors, style, and thickness. In low res you can pick a color from 0 to 15, 0 to 3 in medium, and 0 or 1 in high. Line thicknesses can be any odd number. The style is a number from 1 to 7, which allows a selection of solid line, dotted and dashed lines, and even a programmable line style.

These are not normal Logo functions—they are some of the standard features of TOS which are made available through Logo. Table 1 shows the functions added to Logo to take advantage of a few of the many features of TOS.

Time For TOS

TOS is the name for the systems software that loads into the ST when it is first booted up. It is divided into five distinct parts: the BIOS, BDOS, GEM VDI, GEM AES, and the GEM Desktop.

BIOS and the BDOS are similar to the operating systems for the last genera-



tion of PC's. They handle device I/O and disk access (respectively), and at a pretty low level.

The GEM VDI and AES provide the tools to get the most out of the horsepower in the ST. VDI, or Virtual Device Interface, consists of a set of program routines that handle graphics and other kinds of high-level I/O. AES, or Applications Environment Services, handles the windows, pull-down menus, and other functions that are important to applications.

The GEM Desktop is the first program run by the ST when it boots. It performs a similar function to the DUP.SYS program for the 8-bit Atari computers—it lets the user read the disk directory, load and copy programs and disk drives, and other useful functions. The desktop is just a program like any other, using calls to the AES,

VDI, and other built-in software to perform its function.

Why GEM?

GEM was designed to provide a set of standard programming tools that would be useful on a variety of computers. GEM functions automatically make the translations necessary for individual systems. In fact, a program is told by GEM what the various parameters of the system are, like screen resolution, number of colors, etc.—so the same C language program that works on an Atari ST will also work on an IBM PC, even though the IBM doesn't have as many colors or as fine resolution. This is also used so that the same program runs in all the resolution modes of the ST.

The GEM VDI is chock-full of graphics routines that even a lowly BASIC program can get at. The VDI can make circles, lines, filled shapes, and text in many sizes and styles, and lots more.

VDI has a set of routines for animation for any area of the screen or memory. These routines, called raster operations in the Digital Research documentation but more commonly known as Bit Blt (pronounced Blit, short for Bit Block Transfer). You feed in the coordinates of your rectangular area and the system can "peel it off" the screen and move it somewhere else.

For those of you who were wondering where the player-missile graphics or sprites are, here's the answer. The 68000 and the ST video hardware is so fast at this kind of thing that dedicating hardware to it is not necessary.

First Look at GEM VDI

To get a better look at the VDI I have extracted a set of commands that work together. These commands are all related to the *Polyline* function (as well as others), and are gathered together in Table 2.

Polyline draws a line or a series of connected lines from point to point on the screen. To get this function to operate, you put the coordinates of the endpoints into an area of memory and jump into the VDI. GEM does all the hard work, like figuring out where the pixels go.

Polylines can have many attributes, and there are separate VDI functions to select these possibilities. GEM can

Table 1: TOS Function from LOGO

```
BOX [ X Y width height ]
ARC [ X Y radius begin-angle end-angle ]
CIRCLE [ X Y radius ]
ELLIPSE [ X Y x-radius y-radius ]
POLY [ X Y X2 Y2 . . . Xn Yn ]
SETFILL [ style index color ]
FILLATTR
SETLINE [ style width color ]
LINEATTR
SETTEXT mode
```

Table 2: VDI Opcodes Related to Polyline

6: POLYLINE

CONTRL(0)	6
CONTRL(1)	number of points (>1)
CONTRL(3)	0
PTSIN(0)	X1
PTSIN(1)	Y1
PTSIN(2)	X2
PTSIN(3)	Y2
etc.	

15: SET POLYLINE LINE TYPE

CONTRL(0)	15
CONTRL(1)	0
CONTRL(3)	1
INTIN(0)	type

TYPE	DESCRIPTION	PATTERN
1	solid	1111111111111111
2	long dash	1111111111110000
3	dot	1110000011100000
4	dash, dot	1111111000111000
5	dash	1111111100000000
6	dash, dot, dot	1111000110011000
7	defined by opcode 113	

113: SET USER-DEFINED LINE STYLE

CONTRL(0)	113
CONTRL(1)	0
CONTRL(3)	1
INTIN(0)	16-bit pattern

16: SET POLYLINE WIDTH

The value of the width set by this function can be any odd number.

CONTRL(0)	16
CONTRL(1)	1
CONTRL(3)	0
PTSIN(0)	width of line
PTSIN(1)	0

17: SET POLYLINE COLOR INDEX

CONTRL(0)	17
CONTRL(1)	0
CONTRL(3)	1
INTIN(0)	color (0-15 lo res, 0-3 med, 0-1 high)

108: SET POLYLINE END STYLES

CONTRL(0)	108
CONTRL(1)	0
CONTRL(3)	2
INTIN(0)	style for starting point
INTIN(1)	style for ending point

STYLE	DESCRIPTION
0	squared
1	arrow
2	rounded

draw lines in any color. It can adjust their thickness, or draw patterned or dotted lines. It can even put arrows or rounded ends on them.

Talking to GEM


An area of memory has been reserved for three sets of input and two sets of output parameters. The input parameters are PTSIN, where (x,y) coordinates of points go; INTIN, where lists of integers go; and CONTRL, which holds command numbers, the number of parameters held in PTSIN and INTIN, and other information for opcodes. The output parameters are PTSOUT and INTOUT, which return error codes and other useful information from the VDI.

For BASIC programmers, making use of the VDI involves several POKES followed by a special command to enter the VDI. C and assembler programmers would make use of the library of "bindings" and simply pass the needed parameters.

Certain registers are standardized. CONTRL(0) is the opcode number of the GEM function. CONTRL(1) holds the number of points (x,y pairs) held in PTSIN, and CONTRL(3) holds the number of integers in INTIN.

Let's say we want to draw a triangle on the screen, using a dash-dot line, with arrows on the endpoints. We would need to execute opcode 15 to select mode 4 for the line style, then execute opcode 108 with mode 2 for each end. Finally, we execute opcode 6 with the list of four endpoints (three corners and back to the beginning).

There's Lots More

At this point I've described only 6 of the VDI opcodes. But there's over 150 opcodes in the VDI and that doesn't even get into the AES or the BIOS. So, we'll "draw the line" here for now and promise more reports next time. 

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CONTINUED FROM PAGE 59

grams, initialize MOVE\$, and determine the address of the new set. Then use the starting address as the first (and only) argument in the USR call:

```
A = USR (ADR(MOVE$),addr)
```

After the character set has been relocated, the computer will underline each character and save the new set to disk, using CIO. The type [RETURN] and the set will be reloaded back into memory and activated. This may seem a bit redundant, but the program was designed to illustrate a point. You no longer have to move, alter, and save the character set each time you wish to use it. The set has to be saved only once and can then be loaded into RAM at your whim.

Listing 3 is the assembly source code for the machine language routine that relocates the character set in LISTING 2.

Listing 4 illustrates another problem that cassette users may encounter when using the CIO. You may notice that lines 570 and 740 of Listing 4 are skipped over when using a tape recorder. For maximum speed efficiency, the program uses short inter-record gaps (AUX2=128) with the cassettes. This creates a significant I/O speed increase, but it is, unfortunately, too fast for BASIC to keep up with. To save the GRAPHICS mode and the colors, I used BASIC's PUT/GET commands because there are only ten bytes to transfer.

Soon after the program begins, it will ask whether to initialize either a disk or a cassette drive. After you have answered this, the program will draw a simple demo screen and then save it to your device. When the data is being saved on disk, a colored mark will travel across the screen. This indicates

what information the CIO is changing and rewriting as it goes along.

After the screen is saved, you will be prompted to press [RETURN] to reload the picture. After doing this, the picture will load into memory before your eyes and then begin to rotate through different color patterns.

Some Final Words

You may not yet fully appreciate the speed of the CIO. If not, go ahead and rewrite these programs so that they use PUT and GET exclusively. You'll be amazed at how much faster the CIO really is.

By no means are these two programs the limitations to the CIO's potential. Anytime you have a large amount of data to transfer between your computer and a storage device, using the CIO is an ideal way to do it. ▲

Listing 2

```
100 REM *** LISTING 2 ***
110 REM
120 GRAPHICS 0:POKE 710,0:POKE 712,66
130 DIM FILES(13),MOVES(34)
140 RESTORE !EDR X=1 TO 34:READ Y:MOVE
$(X)=CHR$(Y):NEXT X
150 REM
160 REM *****
170 REM * ML RFLDCATION DATA *
180 REM *****
190 REM
200 DATA 104,104,133,207,104,133,206,1
69
210 DATA 0,133,204,169,224,133,205,162
220 DATA 4,160,0,177,204,145,206,136
230 DATA 200,249,230,205,230,207,202,2
00
240 DATA 242,96
250 ? :? "Do you have a:"
260 ? :? " (0) Disk Drive"
270 ? :? " (1) Cassette Drive"
280 ? :? "Enter your selection: ";
290 OPEN #1,4,0,"K:"
300 GET #1,DEV:IF DEV<40 OR DEV>49 THE
N 300
310 CLDSE #1:DEV=DEV-40
320 ? DEV
330 FILES="D:CHARSET.CIO"
340 IF DEV THEN FILES="C:"! ? :? "Rewin
d cassette, press PLAY & RFCORD."
350 ? :? "Type [RETURN] to continue."
360 POKE 764,255
370 IF PEEK(764)<>12 THEN 370
380 POKE 764,255
390 REM
400 REM *****
410 REM * SET UP AREA FOR CHARSET *
420 REM *****
430 REM
```

```
440 RAMTOP=PEEK(106):CHSET=(RAMTOP-4)*
256
450 POKE 106,CHSET/256-4
460 GRAPHICS 0:POKE 710,0:POKE 712,66
470 REM
480 REM *****
490 REM * MOVE THE CHARACTER SET *
500 REM *****
510 REM
520 A=USR(ADR(MOVE$),CHSET)
540 REM
550 REM *****
560 REM * UNDERLINE EACH CHARACTER *
570 REM *****
580 REM
590 ? :? "How modifying the character
set..."
600 FOR X=CHSET+7 TO CHSET+1023 STEP 8
610 POKE X,255
620 NEXT X
630 REM
640 REM *****
650 REM * SAVE THE MODIFIED SET *
660 REM *****
670 REM
680 POKE 19,0:POKE 20,0
690 ID=1:IF DEV THEN POKE 764,12
700 OPEN #ID,0,120*DEV,FILES
710 ADRES=CHSET:BYTES=1024
720 ? :? "HOW SAVING CHARACTER SET..."
730 GOSUB 290DD
740 TIME=(PEEK(20)+PEEK(19)*256)/60
750 ? :? "FINISHED SAVING.":? "TIME EL
APSED= ";TIME;" seconds."
760 IF DEV THEN ? :? "Rewind cassette,
press PLAY."
770 REM
780 REM *****
790 REM * LOAD IN THE NEW SET *
800 REM *****
810 REM
820 ? :? "Type [RETURN] to load in the
```

Listing 2, continued

```

new      character set."
830 POKE 764,255
840 IF PEEK(764)<>12 THEN 840
845 POKE 764,255
850 POKE 19,0:POKE 20,0
860 IO=1:IF 0EV THEN POKE 764,12
870 OPEN #1,4,128*DEV,FILES$
880 ADRES=CHSET:BYTES=1024
890 ? :? "NOW LOADING NEW CHARACTER SE
T..."
900 GOSUB 29000
910 TIME=(PEEK(20)+PEEK(19)*256)/60
920 ? :? "FINISHED LOADING.":? "TIME E
LAPSED=";TIME;" seconds."
930 REM
940 REM *****
950 REM * ENABLE NEW CHARACTER SET *
960 REM *****
970 REM
980 POKE 756,CHSET/256
990 END
29000 REM *****
29010 REM
29020 I0CB=032+I0*16
29030 ICC0M=I0C0+2:IC0AL=I0CB+4:IC0AH=
I0CB+5
29040 I0BL=I0C0+8:I0LH=I0C0+9:ICAX1=
I0C0+10
29050 REM *****
29060 REM *****
29070 POKE ICC0M,7+4*(PEEK(ICAX1)=0)
29080 A0RH=INT(A0RES/256):A0RL=A0RES-A
0RH*256
29090 0YTEH=INT(BYTE5/256):0YTEL=0YTES
-BYTEH*256
29100 POKE IC0AL,A0RL:POKE IC0AH,A0RH
29110 POKE IC0LL,0YTEL:POKE IC0LH,BYTE
H
29120 CIO=USR(A0R("h h h L V"),I0*16)
29130 CLOSE #10
29140 RETURN

```

Listing 3

LISTING 3

The following listing is the assembly source code for the machine language routine that relocates the character set in LISTING 2.

```

10      .OPT OBJ
20      .TITLE " LISTING 3 ROM WALLS
30 *****
40 *      LISTING 3      *
50 * RELOCATE CHARACTER SET *
60 *****
70 ;
80      *= $0680
90 ROMSET = $CC      ;ROM character set
0100 NEWSET = $CE      ;modified set loc.
0110      PLA          ;arguments off stac
k
0120      PLA          ;M50 new character se
t
0130      STA NEWSET+1 ;store to hi byt

```

```

e
0140      PLA          ;L50 of new set
0150      STA NEWSET      ;store lo byte
0160      LDA #5E0      ;M50 of ROM set
0170      STA ROMSET+1 ;store to hi byt
e
0180      LDA #0          ;LSB of ROM set
0190      STA ROMSET      ;store to lo byt
e
0200      LOY #0          ;byte counter
0210      LOX #4          ;page counter
0220 MOVE LDA (ROMSET),Y;byte from ROM
set
0230      STA (NEWSET),Y;move to new lo
c.
0240      0EY          ;decrement
0250      BNE MOVE      ;page finished?
0260      INC ROMSET+1 ;yes- locate pag
e
0270      INC NEWSET+1 ;next page
0280      DEX          ;decrement page
0290      BNE MOVE      ;done 4 pages?
0300      RTS          ;yes- return to BASI
C

```

Listing 4

```

100 REM *** LISTING 4 ***
110 REM
120 GRAPHICS 0:POKE 710,0:POKE 712,66
130 OIM FILES(13),COL(8)
140 ? :? "Do you have a:"
150 ? :? " (0) Disk Drive"
160 ? :? " (1) Cassette Drive"
170 ? :? "Enter your selection: ";
180 OPEN #1,4,0,"K:"
190 GET #1,0EV:IF 0EV<40 OR 0EV>49 THE
N 190
200 CLOSE #1:0EV=0EV-40
210 ? 0EV
220 FILES="D:GRAPHICS.CIO"
230 IF 0EV THEN FILES="C:":? :? "Rewin
d cassette, press PLAY & RECORD."
240 ? :? "Type [RETURN] to continue."
250 POKE 764,255
260 IF PEEK(764)<>12 THEN 260
270 POKE 764,255
280 REM
290 REM *****
300 REM * DRAW A PICTURE *
310 REM *****
320 REM
330 MO0E=10:GRAPHICS MO0E
340 POKE 704,0:POKE 705,42:POKE 706,50
:POKE 707,74:POKE 708,90:POKE 709,106:
POKE 710,122:POKE 711,130:POKE 712,154
350 COL=1:FOR X=0 TO 79:COLOR COL:COL=
COL+1:IF COL=9 THEN COL=1
360 PLOT X,0:ORANT0 79-X,191
370 NEXT X
380 FOR X=191 TO 0 STEP -4:COLOR COL:C
OL=COL+1:IF COL=9 THEN COL=1
390 FOR Y=0 TO 3
400 PLOT 0,X-Y:ORANT0 79,191-X+Y
410 NEXT Y
420 NEXT X
430 REM
440 REM *****
450 REM * GET COLOR REGISTERS *

```


Listing 4, continued

```

460 REM *****
470 REM
480 FOR X=0 TO 0:COL(X)=PEEK(704+X):NE
XT X
490 REM
500 REM *****
510 REM * SAVE THE GRAPHICS SCREEN *
520 REM *****
530 REM
540 IO=1:IF DEV THEN POKE 764,12
550 OPEN #IO,0,128*DEV,FILES$
560 IF DEV THEN 580
570 PUT #IO,MODE:FOR X=0 TO 0:PUT #IO,
COL(X):NEXT X
580 ADRES=PEEK(88)+PEEK(89)*256:8YTES=
PEEK(106)*256-ADRES
590 GOSUB 29000
600 GRAPHICS 0:POKE 710,0:POKE 712,66
610 IF DEV THEN ? :? "Rewind cassette,
press PLAY."
620 REM
630 REM *****
640 REM * LOAD IN THE GR. SCREEN *
650 REM *****
660 REM
670 ? :? "Type INPUT#1 to load in the
GRAPHICS screen."
680 POKE 764,255
690 IF PEEK(764)<>12 THEN 690
700 POKE 764,255
710 IO=1:IF DEV THEN POKE 764,12

```

```

720 OPEN #IO,4,128*DEV,FILES$
730 IF DEV THEN 750
740 GET #IO,MODE:FOR X=0 TO 0:GET #IO,
COL:COL(X)=COL:NEXT X
750 GRAPHICS MODE:FOR X=0 TO 0:POKE 70
4+X,COL(X):NEXT X
760 ADRES=PEEK(80)+PEEK(89)*256:8YTES=
PEEK(106)*256-ADRES
770 GOSUB 29000
780 REG=705:COL=PEEK(REG)
790 IF REG=712 THEN POKE REG,COL:GOTO
700
800 POKE REG,PEEK(REG+1)
010 REG=REG+1
020 GOTO 790
29000 REM *** CIO PUT/GET ***
29010 REM
29020 IOCB=832+IO*16
29030 ICCOM=IOCB+2:IC0AL=IOCB+4:IC0AH=
IOCB+5
29040 IC0LL=IOCB+8:IC0LH=IOCB+9:IC0X1=
IOCB+10
29050 REM * IC0X1=7 for Head *
29060 REM * ICCOM=11 for PRATE *
29070 POKE ICCOM,7+4*(PEEK(IC0X1)=0)
29080 ADRH=INT(ADRES/256):A0RL=ADRES-A
DRH*256
29090 8YTEH=INT(8YTES/256):8YTEL=8YTES
-8YTEH*256
29100 POKE IC0AL,ADRH:POKE IC0AH,ADRH
29110 POKE IC0LL,BYTEL:POKE IC0LH,BYTE
H
29120 CIO=USR(ADR("hhhlluv"),IO*16)
29130 CLOSE #IO
29140 RETURN

```

The Meaning of LSB/MSB

To understand this article, you should be able to break a number down into its Least Significant Bytes (LSB) and Most Significant Bytes (MSB). This is because sometimes a number larger than 255 must be stored in a memory location. In order to be stored, a large number needs to be split into smaller elements and stored into two consecutive bytes. In the ATARI 8 bit computers LSB/MSB is how it's done.

To arrive at the MSB of a number, divide the original by 256 and take the integer of this quotient. The LSB is determined by subtracting 256 times the MSB from the original number. For example, to break the number 42629 into its LSB/MSB:

$$\begin{aligned} \text{MSB} &= \text{INT}(42629/256) \\ \text{MSB} &= 166 \end{aligned}$$

$$\begin{aligned} \text{LSB} &= 42629 - \text{MSB} * 256 \\ \text{LSB} &= 42629 - 166 * 256 \\ \text{LSB} &= 133 \end{aligned}$$

To calculate the original number, multiply the MSB by 256, and add this product to the LSB.

$$\begin{aligned} \text{NUMBER} &= \text{MSB} * 256 + \text{LSB} \\ \text{NUMBER} &= 166 * 256 + 133 \\ \text{NUMBER} &= 42629 \end{aligned}$$

Because any integer under 65536 will fit into the LSB/MSB form, any of the bytes in the Atari 8 bit machines

can be accessed by using this method.

If you wish to store your numbers using the POKE command, note that the LSB is always stored in memory before the MSB. Your ATARI already knows how to use LSB/MSB and, in fact, uses it quite often. For example, bytes 560 and 561 store the starting address of the Display List (SDLSTL). To calculate the value of this address, you would enter the following:

$$\text{SDLSTL} = \text{PEEK}(560) + \text{PEEK}(561) * 256$$

Byte 560 is the LSB, byte 561 is the MSB. There are many such vectors present in the ATARI computers pointing to various places of importance. ▲

The Atari Bookshelf

by Bill Wilkinson



The Atari Bookshelf will briefly review and compare a few books each issue, focusing on a single topic each time. The omission of a book from this column does *not* mean that I rejected, just that I haven't reviewed it. If you have a favorite book which I have not yet reviewed (or which you feel I have slighted), write to me at P.O. Box 710352, San Jose, CA 95171. I won't guarantee your satisfaction, but, if you include a self-addressed, stamped envelope, I will at least acknowledge your help. Enough chit-chat. On with the reviews.

This month's topic: Software Review Books. Just as I write a column to review books, others write books to review software. A software review book can be a real masterpiece, including helpful hints for beginners, ratings for the software in a variety of categories, and how-to-buy information. Are all review books that good? Would I, in turn, be reviewing them if they were? Here, then, are some of the more popular software review books, with a few comments on each and a rating box for quick comparisons.

The Blue Book for the Atari Computer

This is *not* a book of software reviews, no matter how you look at it. It is simply a directory of programs available for Atari computers. Each entry in the directory is accompanied by a description, some comprehensive and lengthy.

Now there's nothing wrong with publishing a directory such as this. Every software store and library should have one, right? Wrong. First, the descriptions are lifted from manufacturers' catalogs and advertisements. In at least a few cases, the descriptions are for the wrong programs! Second, this book is blue because it was holding its breath waiting to be published. Even though

it has a 1984 copyright, it is hopelessly out of date. For example, it includes material copied verbatim out of one company's 1982 brochures.

Summary: The really unfortunate part about this book is that it *could* have been valuable under the right circumstances. These aren't the right circumstances, and this book isn't valuable. If you see a program which looks interesting, spend 22¢ to write and ask the manufacturer for a brochure, which will undoubtedly be more accurate than this book.

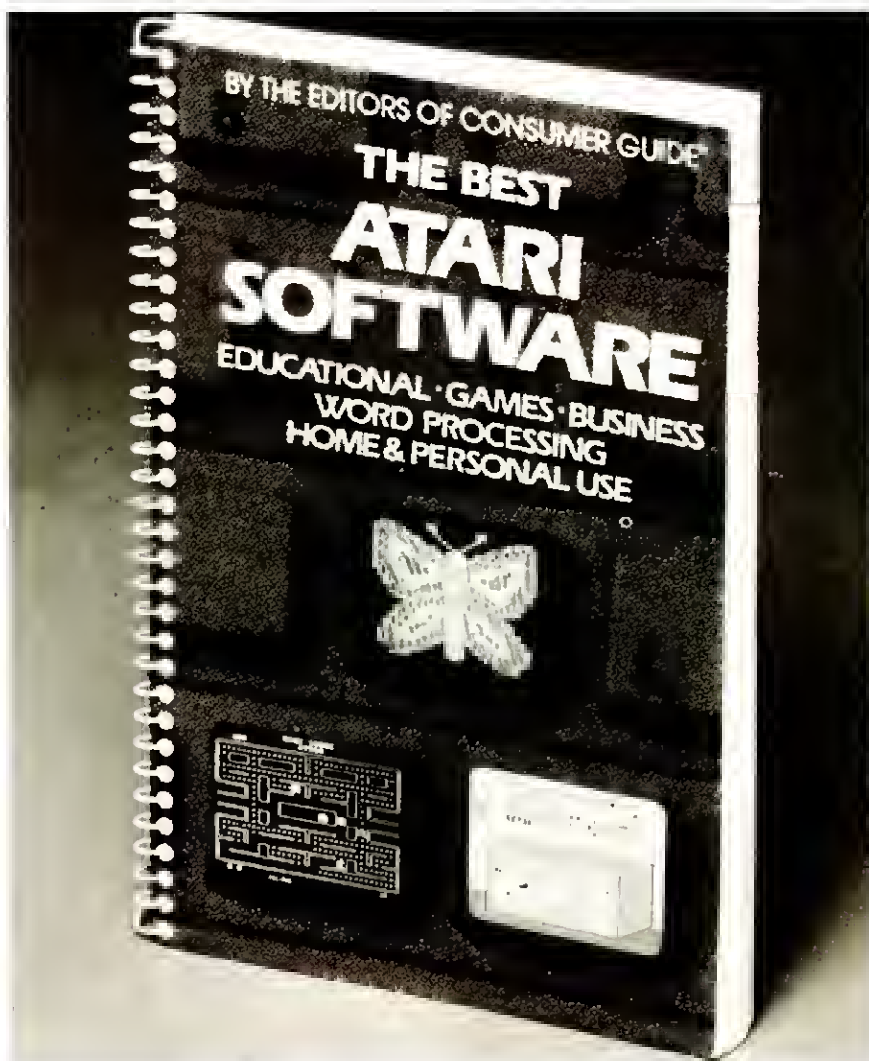
published by WIDL Video, 1984, \$17.95

The Best Atari Software

Published by the editors of *Consumers' Guide*, this should be the most prestigious of the review books. A company that has been in the reviewing business for years should know how to do it correctly.

You may be a little surprised however, as I was, to read in the introduction to this fairly small paperback that the ratings assigned come from a survey of user groups. This method has advantages and disadvantages—ideally, you get ratings that don't reflect an individual author's prejudices, but you also have more programs receiving virtually identical scores.

**** = Terrific
 *** = Good
 ** = Fair
 * = Poor



Nevertheless, I found it to be a reasonably fair book. I think that the word "best" in the title goes a little too far, because it simply means low-ranked programs were left out. (Quite a few excellent programs simply didn't get reviewed at all.) The result is a book which at least has a justification for its grade inflation, but it has almost no outstanding good or bad grades. The descriptions accompanying the grades

are sometimes short, and the book is slightly out of date now, but there's still a lot of value here.

Summary: At the price, you can't really go wrong. But watch for newer—and often better—software not reviewed in this book.

by Jim Bumpas and the Editors of *Consumer Guide*, published by Publications International, Ltd., 1984.

	Useful to Beginners → Advanced	Date	Accuracy	Organization	Readability	Information Value	Overall
Infoworld's Essential Guide to the Atari,	██████████	Late 84	*** ½	****	****	*** ½	****
Book of Atari Software 1984	██████████	Late 83	***	****	****	***	*** ½
Book of Atari Software 1985	██████████	See Text	**	***	***	**	** ½

The Book of Atari Software

1985

Despite the similarity of name, this book was *not* produced by The Book Company. The title is also a misnomer; the date should be 1983. Several of the programs reviewed in this volume are no longer available. Many of the best and newest programs for Atari computers are not even mentioned. As a long time Atari fanatic, I get the feeling that the editors don't really know the Atari market very well.

On the other hand, they do know how to edit reviews. Some of the discussions of program advantages and disadvantages are particularly well thought out, especially for the educational programs. As with the 1984 book, products earn ratings in several appropriate categories. Here the grades are on a scale of one to ten, but that doesn't help the grade inflation problem. You have to look hard to find any grade under seven, and that just doesn't make sense.

Summary: By the time you read this, it will be only a few months until *The Book of Atari Software 1986* appears (from *some publisher*). Unless you need some reviews on educational software, wait.

published by Addison-Wesley, 1984, \$19.95

1984

This book is (or was) available from two publishers—Addison-Wesley and The Book Company. The latter is also the home of the editorial staff for this book, and this is their second edition (the first being *The Book of Atari Software 1983*).

This is the biggest and most comprehensive of all the Atari software review books. It lists hundreds of programs, from the best to the worst, giving letter grades on many aspects of each program. One thing the book does well is to select rating categories that are pertinent to the type of program being reviewed. For example, arcade games are given ratings on sound, graphics,

playability, and much more. Business program ratings, on the other hand, concentrate on documentation and error handling.

One problem with this book is the inconsistency in the letter grades assigned. One game may have a fairly enthusiastic description and receive a B for its overall grade, while a similar program may be discussed in only lukewarm terms and earn the same grade. Because a book of this magni-

tude may be the work of several reviewers, there may be no way to avoid such minor discrepancies, but it is annoying nonetheless. I will say that I didn't disagree by more than one point with the overall grade for any rated program.

Summary: If you are looking for a catalog of almost every software package available for your Atari computer, add this one to your collection. Unfortunately, this book has dated since it appeared in very early 1984.

by Stanton, Wells, Rochowansky, and Mellin, published by Addison-Wesley and The Book Company, 1984, \$19.95

InfoWorld's Essential Guide to Atari

InfoWorld is a weekly computer news magazine devoted primarily to coverage of the business-oriented microcomputer market. Among other things, it is known for its rating system, giving marks ranging from poor to excellent on four or five general aspects of each reviewed software package. The magazine has barely tolerated Atari computers ("not business-oriented enough") and has seldom featured software designed primarily for use on Atari machines. In fact, I was skeptical when I first learned of this book: Who at *InfoWorld* knew enough about Atari-compatible software to write the necessary reviews? Surely they weren't going to try to put together a book out of reprints from the magazine?

I am happy to report that my fears were completely groundless: The book excels in several ways. First, it is fairly up to date (late 1984), in contrast to some of the other books we will look at, and most of the reviews were written especially for the book. Second, although the software ratings for some programs may be inflated, the accompanying descriptions generally give enough information to keep you on the right track. Third, and perhaps most important, it is *not* simply a collection of reviews.

A sizable portion of the book is devoted to information especially written

for the newcomer to Atari computers. There's at least a smattering about almost every important computing aspect. Topics covered include: history of Atari as a company, communications using a modem, user groups and free software, and much more.

One section of the book only two pages long may be worth the price of the book all by itself: a listing of the many uses for an Atari computer, with the recommended minimum equipment for each use. Invaluable!

If I have any reservations about the book, they center around the relatively small amount of software which is reviewed. A few really nice programs that deserve to be included aren't there, though many programs not reviewed are at least mentioned. On the other hand, there aren't any real stinkers listed here. The editor and authors apparently tried to include at least a sampling of the best of every kind of software.

Summary: This book may not be essential for intermediate and advanced users, but it comes very close to being a necessity for beginners.

Well, that's it for this time. Next issue: some general information books. **A**

by Scott Mace and the Editors of InfoWorld, published by Harper and Row, 1984, \$16.95

Atari Computer Games for Two or More

by Arnie Katz and Bill Kunkel

Solo play so thoroughly dominates home computer gaming today that many newcomers may not realize solitaire contests were once quite a rarity. In fact, most of the electronic games introduced during the decade after PONG were intended for at least two participants.

Cartridge videogame units emphasized multiplayer programs. During that period, most people connected their systems to the living room television set. Playing video games became an alternative to watching broadcast TV, something the whole family did together. That's why even SPACE INVADERS, though essentially solitaire in nature, allows two humans to shoot aliens in alternating turns.

The rise of the microcomputer brought some profound changes in the way people play electronic games. While video games were frequently set up on the floor in front of the television and taken down after each play-session, computers are generally more permanent and often use a special monitor for display.

The first Atari computers, the 400 and 800, bucked the trend by providing four joystick/paddle ports. Atari eventually capitulated to the industry standard, reducing the number of ports to two on all succeeding models. (Owners of the older computers will find several programs that make excellent use of the outstanding input potential reviewed in this article.)

More typical of home computing was the Apple II, which has only a single

port. Designers of software for the Apple, mindful of its large memory and singular joystick connection, concentrated on developing programs in which computer intelligence substitutes for a live opponent.

The preponderance of one-player games dovetailed with the field's self-image at the time. Most computerists liked to see themselves as lonely pioneers, exploring the secrets of the marvelous new technology in monkish isolation. Hermits don't need multiplayer pastimes.

Having swung to one extreme, the pendulum is now moving back toward the middle ground. Solitaire programs are still the mainstay, but it's hardly unusual, these days, to see two or even more gamers clustering around a work station. Testing one's skill against live opposition has an excitement and immediacy which even the cleverest artificial intelligence program can't match.

It's only fitting to start this survey of two- and multiplayer computer games with the title which ignited the head-to-head renaissance.

Julius Erving and Larry Bird Go ONE-ON-ONE

ONE-ON-ONE made the industry realize that players could get excited about a sports simulation for two. The solo version is fine, but there's nothing like watching these two hoop stars clash when there's a human coach pulling the strings for each.

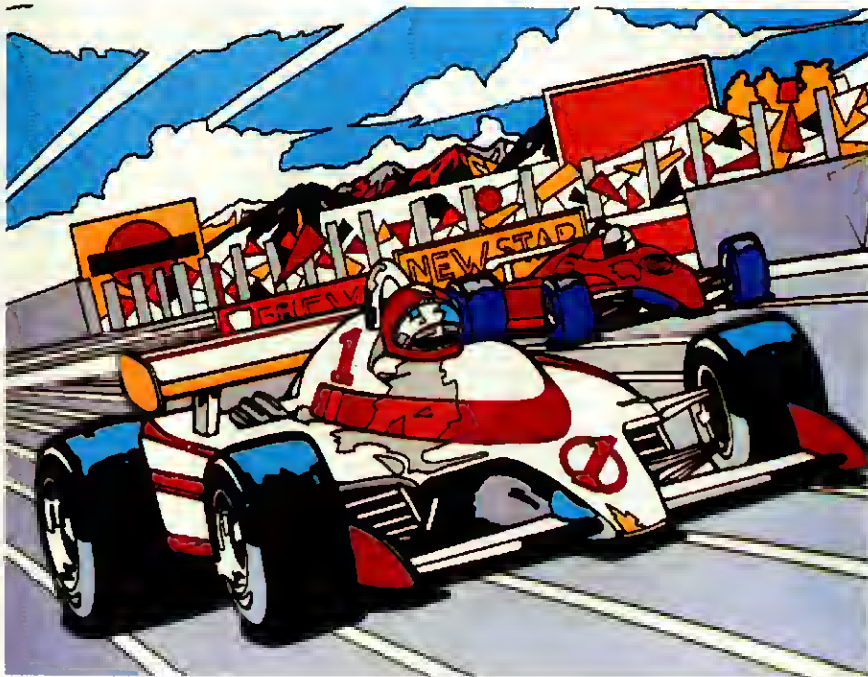
Of course, it doesn't hurt that the program is a masterpiece of design and execution. ONE ON ONE is a significant design breakthrough because it combines all three approaches to simulating sports: action, strategy, and statistical replay.

The action element is obvious. Players use a joystick to maneuver the surrogate over the half court and employ

the button to either spin the ballhandler 180 degrees or make him shoot. On defense, the button initiates steals and blocks. At the appropriate time, hitting the button also causes the athlete to leap for the rebound.

Statistics and strategizing come into the picture because, in ONE ON ONE, the computerists aren't just shuttling humanoid cursors around the playfield. The digital athletes are mathematical models which perform in the game exactly the way Larry Bird and Julius Erving do in real life. The computer replicas have the same weaknesses and strengths as these all-time great hoop heroes, including equivalent

CONTINUED ON PAGE 78



CONTINUED FROM 8

The next generation of racing simulations is represented by PITSTOP. For the first time, strategic considerations are added to the excitement of roaring down the track. As in actual endurance races of this sort, the pitstop is crucial to the successfully run race. A skilled, speedy pit crew can do as much for a car's chances as the proficiency of the driver.

The PITSTOP roadway is studded with turn-offs that lead to pit areas. Cars must stop for repairs and refueling periodically. Guided by on-screen icons, the driver can switch tires, fill the tank, and perform a variety of necessary maintenance functions before returning to the track. It is likely to take most gamers far longer to master this element of the game than the actual driving.

Graphics in PITSTOP are not nearly as lush and impressive as POLE POSITION's. There is virtually no roadside scenery, and the action is stripped down to the barest essentials. In another example of the sort of tradeoffs required in lower-memory programs, the author of PITSTOP wisely decided to put most of the design chips into the pit portion of the contest.

RALLY SPEEDWAY, on the other hand, is a throwback. John Anderson has turned his back on the grit and throb of big-time racing to celebrate the

innocent joys of slot-car style action.

Obviously inspired by the Midway coin-op, RALLY-X, RALLY SPEEDWAY is a multidirectional scrolling race game featuring a macrolayout and overhead viewing perspective.

RALLY is certainly loaded with options. One or two players can set the road conditions, customize the acceleration and speed characteristics of their vehicles and, if desired, leave reality far behind by employing the "Only in a Computer" option. This mode turns the player's auto into a phantom which passes through trees and houses without the slightest problem. There's even a setting that allows players to construct their own track and save it to disk for later replay.

The bird's eye view causes a couple of problems. For one thing, it totally eliminates any vicarious sense of driving. Also, the driver can't see beyond the edge of the screen, so there's no way to prepare for upcoming turns and obstacles. Even more troublesome is that, in the two-player mode, both cars must occupy the same screen at the same time. Therefore, once one vehicle builds a screen's length lead, that's as far as it can go.

The "realistic" steering setup can raise some hackles, too. The following example points up the difficulty: A racer moving left to right on a horizon-

tal roadway wants to turn the vehicle onto a road which branches to the left to head due North. The maneuver many gamers would find most logical, pointing the stick to 12 o'clock to make the turn, turns out to be completely wrong. In RALLY SPEEDWAY, a left turn is a left turn, so the stick must be moved left. The trick is to remember that you're sitting in the car's front seat with the joystick in your hand.

RALLY SPEEDWAY offers cute graphics and an interesting variation on auto racing programs.

BAJA BUGGIES, *Gamestar*, 1982/16K disk.

POLE POSITION, *Atari*, 1983/Cartridge.

PITSTOP, *Epyx*, 1984/Disk.

RALLY SPEEDWAY, *Designed by John Anderson, Adventure International*, 1984/Cartridge.

Anyone for Tennis?

Tennis

What evokes the feeling of summertime better than a few good simulated groundstrokes? Video tennis is as old as electronic gaming itself, but designers have recently returned to this supposedly gamed-out subject with renewed enthusiasm and inventiveness.

Over the years, most tennis programs have employed the same perspective and play mechanic. One or two gamers use the joystick to maneuver the racquetters around a trapezoidal court with the net horizontally bisecting the screen. Getting into the right position, therefore, becomes the major objective in such programs. The computerist moves the surrogate to the best place on the court to take a shot, and then scrambles back to a defensible spot to await a return volley.

Atari's TENNIS, indisputably the best title in this mold, features some lovely trimmings, including bunting-draped grandstands and a beautifully drawn court. It isn't a major breakthrough in tennis simulations, but it will certainly serve netsport lovers well until a better one comes along.

CONTINUED ON PAGE 76



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More to Come?

CONTINUED FROM PAGE 73

On the immediate horizon are several additions to the pantheon of summer sports simulations. Publishers are anxious to expand their libraries of sports programs, and warm-weather athletics have proved to be a popular and fertile field.

Motor sports fanatics have a real treat coming from Epyx. The company is readying an Atari computer edition of PITSTOP II, a sequel to PITSTOP. Besides the usual improvements, the new game utilizes a horizontally split screen to let two human participants race head-to-head. Also likely to prove entertaining is THE RACEWAY DESTRUCTION SET from ELECTRONIC ARTS. This title lets players create their own cars and courses before figuratively getting behind the wheel.

Epyx is developing a follow-up to SUMMER GAMES. The line-up of events wasn't completely set as this magazine goes to press, but the mix is



expected to include equestrian and fencing contests. The same publisher is also considering a title called TWO ON TWO, which would spotlight non-Olympic sports like tug-of-war.

So mix the lemonade, slap on the sunscreen, and get ready for a sizzling season of computer sports gaming. ♣

TENNIS, Atari, 1984/Cartridge

REVIEWS

CONTINUED FROM PAGE 45

Bounty Bob's cavern within the mine. Bounty Bob's goal is to search every foot of framework, moving from playfield to playfield in quest of his elusive quarry.

In this one- or two-player action extravaganza, the joystick moves Bounty Bob along the framework, which is depicted in pseudo-3-D perspective, rather than the side view shown in MINER. Every piece of framework Bounty Bob touches turns solid which indicates it has been successfully claimed. If Bob covers the entire screen before the countdown clock at the top of the display reaches zero, play proceeds to the next cavern.

Hogue has greatly improved the jumping system which he used in MINER, in which all leaps cover the same distance. In BOUNTY BOB STRIKES BACK, the computerist presses the button to start the jump and then pushes the joystick in the desired direction. By varying the delay between pushing the button and moving the stick, the gamer can vary the length of the hero's bound.

Radioactive mutants, who inhabit the mine, patrol many of the frame-

work sections. Their touch is ordinarily lethal to Bounty Bob, but he gains a limited period of immunity by grabbing one of Nuclear Ned's possessions, which are scattered around the mine. Some screens include a new type of bonus object, super energy food bars which permit Bob to make extra-long leaps.

Curtis Mikolyski's graphics take full advantage of the extra memory chips which Big Five has shoehorned into the cartridge. Those who thought that the graphics of MINER lagged behind its play-action are sure to be pleased by the sequel. The playfields are attractive, and the prizes and special play-features are rendered in colorful hi-res.

The High Score Factory, though admittedly a cosmetic frill of no relevance to the game, is a tremendous achievement. The screen shows two bulldozers on lifts, a mini suction unit, and a nuclear power plant. The joystick moves the lifts up and down to cherry pick the scorer's name letter by letter. Once a name of up to seven letters is selected, the scoreboard appears. Birds fly around the display, picking up letters and depositing them in the appro-

priate spots on the high-score honor roll.

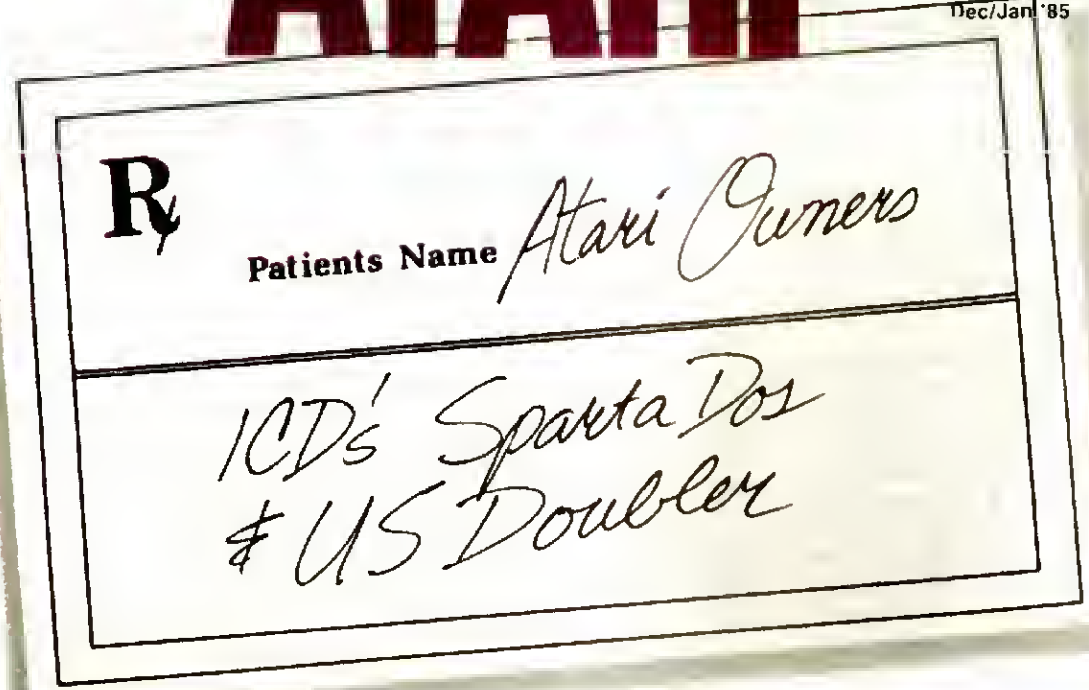
Ultimately, of course, it is the quality and variety of the play features. Most of the ones which spiced up MINER 2049er are back, many in improved versions, and there are a few new ones of merit, too. The vacuum tubes are the best additions. Bounty Bob can whiz across the screen in one, if he first gets the air pressure moving in the right direction by adjusting the corresponding control panel located on the same playfield.

Was BOUNTY BOB STRIKES BACK worth the wait? The answer is a qualified yes. The program is beautifully executed, but it doesn't really provide a fresh setting or push the saga forward very much. Yet during a period in which action games in general have fallen on hard times, BOUNTY BOB STRIKES BACK stands out as absolutely top-quality entertainment that blends a stiff hand-eye challenge with an invigorating dollop of real-time strategizing. ♣

BOUNTY BOB STRIKES BACK, Designed by Bill Hogue, Big Five Software, 1985/Cartridge

"IT ADDS NEW LIFE TO THE ATARI"

- Peter Ellison
ROM Magazine
Dec/Jan '85



Rather than hearing our claims for ICD's SpartaDOS and US Doubler, we think you'd rather know what others say:

"ICD has done something I didn't think was possible... a product so revolutionary it adds new life to the Atari... SpartaDOS is the best I have ever used... (it changed) my Atari's whole concept of what a Disk Operating System should be.

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One-on-One



Dragonriders of Pern

CONTINUED FROM PAGE 72

shooting accuracy from any point on the court.

Then, of course, there are the shot clock and the ubiquitous officials. The pro-level zebra, in particular, is a by-the-book hard case who can fill an aggressive compu-coach with sympathy for Bobby Knight.

The Atari edition is the best available edition of this program. The action is faster than on other machines, and all the visual trimmings imaginable are here for the players' delight: the board-blasting dunk, the janitor sweeping up the mess, slow motion, replays, and the ripple of the net as the ball falls through for two points. The audio is also just about perfect. The range of mood-building sounds includes the bounce of the ball, the satisfying swish of the net when a shot goes in cleanly, the tinkle of broken glass, and the roar of the crowd.

Four difficulty settings are provided. The program is faster at "pro" than "college," but the main difference is that the statistically based shooting percentages are realistically lower. The referee also grows more intrusive when the difficulty setting is raised, so a high setting can protect a gamer from getting mauled by an overly zealous foe. **A**

Designed by Eric Hammond, Julius Erving, Larry Bird, Electronic Arts, 1983/48K disk

Strategy Tests Standout

M.U.L.E., Archon, Archon II: The Adept, and Dragonriders of Pern

Strategy games, whether chess or Monopoly, are fun to play against a computer, but nothing matches the thrill of victory against a living, breathing rival. Computer opponents work well enough, but their current lack of flexibility and their predictability over the long haul ultimately weaken the challenge.

M.U.L.E. is a traditional money game with engaging science fiction trappings. There are always four players, since the computer automatically provides robot participants for any unfilled seats at the table.

Four colonists fight for the best parcels of land on a newly discovered alien world. After claiming land, the player employs a technological marvel known as M.U.L.E. to process food, energy, smithore, or crystite, the most valuable resources on this wasteland.

The game then moves on to the real main event, the anything-goes auction. It is here that players sell surplus production and buy needed materials.

"It is not enough that I succeed, but that all my friends must fail," the fa-

mous literary cynic Oscar Wilde once remarked. That's certainly part of the strategy in M.U.L.E. up to a point. One settler gets richer as the others slide deeper into debt. After 12 turns, the program awards the triumph to the richest player, who acquires the title First Colonist. Too-close adherence to Wilde's maxim can have dire results, however, because one player can do so well that the others go bankrupt, killing off the whole colony.

ARCHON and its sequel, THE ADEPT, are like futuristic chess variants. The major difference is that the rival forces are balanced, but not identical.

ARCHON is a battle between Light and Darkness. The first side which occupies the five special power points on the board wins. The gameboard features light, dark, and variable squares. The neutrals cycle from white to black and back again. Dark pieces are superior on the shadowed squares and Light is mightiest on the white ones.

Combat in ARCHON is much less abstract than in chess. Pieces aren't

taken with a perfunctory tap here. When an icon moves into an occupied square, both are instantly transported to a combat field. Only one foe returns from this screen full of randomly placed obstacles.

THE ADEPT uses a similar premise, this time matching Law against Chaos. Instead of conventional square, the gameboard is composed of zones, which represent the primal elements of earth, air, fire, and water.

Power points are still the goal, but the Adepts attack them indirectly with magically summoned beasts. The challenge is to keep your icons in the right areas. A fire elemental can put up some resistance in a water square, but does much better when battling on its own kind of turf.

As in ARCHON, the Adepts have access to a variety of spells, most of which will be familiar to players of the earlier title. The exception is the Apocalypse. Used to mop up or as a last resort, this is a final, slambang battle with everything on the line.

DRAGONRIDERS OF PERN, based on the book by fantasy writer Anne McCaffrey, turns each player into a Weyr master (a Weyr is a stronghold of dragons and their riders) who must struggle for social and political supremacy with the other Weyr lords.

The game is divided into two phases, diplomacy and war. After jockeying for alliances, the Weyrleader and his or her shocktroops take to the winds to battle falling spores, which present a danger to both the landscape and the fragile political alliances of Pern.

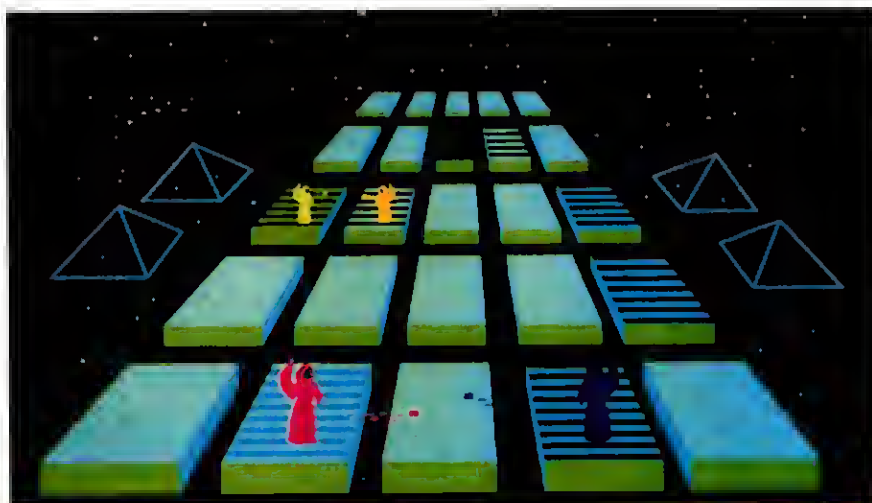
Graphics during these battle scenes are quite good, and a stirring musical score really gets the blood going. The strategy and negotiations are communicated via text. ♣

M.U.L.E. *Designed by Ozark Softscape, Electronic Arts, 1983/48K disk*

ARCHON *Designed by Free Fall Associates, Electronic Arts, 1988/48K disk*

ARCHON II: THE ADEPT *Designed by Free Fall Associates, Electronic Arts, 1984/48K disk*

DRAGONRIDERS OF PERN *Epyx, 1984/48K disk*



Silicon Warrior

Face-to-Face Fights

Joust, Bruce Lee and Silicon Warriors

Few programs take the phrase *head to head* more literally than JOUST. This is airborne combat between knights mounted on winged steeds.

The player uses the joystick to manipulate the on-screen knight. The gamer moves the stick to guide the fighter around the screen and taps the action button repeatedly to make the bird's wings flap.

The object is to strike an oncoming opponent higher than his lance hits your champion. A successful blow often causes the dying bird to lay a gigantic egg, which your knight can catch for bonus points. If the egg remains on the screen long enough, it hatches into a fresh opponent.

JOUST sports a nonscrolling playfield with wraparound edges. The graphics are almost as attractive as in the Williams coin-op, and the playaction is indistinguishable from the play-for-pay machine.

The first screen in BRUCELEE seems almost deceptively easy. The gamer guides the martial arts hero around a sprawling pagodalike palace to gather all the hanging lanterns while Green Yamo and the Ninja try to stop him. Once this is accomplished, Bruce Lee can drop through a trap door and hunt through the labyrinthine caverns in search of a priceless treasure.

The two-player variant is strikingly

innovative. The gamer who is not directing Lee takes charge of Green Yamo. That makes it a lot more difficult for the dragon to do his thing.

SILICON WARRIOR is an action-strategy contest for up to four participants. (The computer can, if the players desire, assume control of any or all of the warriors not in human hands.)

Each player takes charge of one of four powerful computer companies. Once a warrior for each House appears on the five-by-five grid of silicon chips, it becomes a mad race to be the first to imprint five chips in a horizontal, vertical, or diagonal direction with the company's color. The warriors teleport from square to square, but can only move horizontally or vertically. A warrior claims a neutral square by landing on it. If a warrior lands on a chip which a foe has already imprinted, it returns to neutral.

Excellent graphics and madcap playaction, including sundry play options, make this one of the best head-to-head games around. ♣

JOUST *Atari, 1983/Cartridge*

BRUCE LEE *Designed by Ron Fortier, Datasoft, 1984/32K disk*

SILICON WARRIORS *Epyx, 1984/Cartridge*

Split-Screen Software

Ball Blazer, Spy vs Spy

The healthiest sign of the re-emergence of head-to-head software is the publication of two titles, BALLBLAZER and SPY VS. SPY. Both programs break the screen in half horizontally so each player can work independently.

BALLBLAZER, a futuristic arena sport, straps each participant into a small, but speedy, vehicle called a rotofoil. Mounted on the front of this tiny car is a device with which the player can catch the ball and shoot it through the opponent's goalpost.

Each half-screen displays the Ballblazer court as it appears through the window of one of the rotofoils. It's a good tactic to periodically check out what your rival is seeing.

The lure of BALLBLAZER is that it plays as though the program is simulating an authentic sport. Clever on-field strategy is needed to maneuver a rotofoil into position for an unstoppable shot to win the game. The pulse-pounding musical score makes this already exciting contest into a real nail-biter.

SPY VS. SPY is a brain-teasing action-strategy game for one or two based on the comic strip by Antonio Prohias that has appeared in MAD Magazine for more than a decade. Two secret agents, one dressed all in black and the other in white, move through an embassy, laying booby traps for one another and gathering up the necessary items for a safe—and profitable—return home.

The horizontally split display, which shows the embassy in pseudo-3-D, is impressive. The spies not only move from room to room, but they can look behind, inside, and under any object they see. The furnishings all provide hiding places for a selection of devilish traps which each spy can set for the other. When the agents both enter the same room, half of the display goes to black. This alerts the players to the fact that they can now try a club-swinging assault.

The Trapulator, located to the right of the display, is the cornerstone of SPY

VS. SPY. It contains a set of icons, one for each trap, a map function that provides an overview of the building and an inventory of possessions.

The first espionage veteran to gather the plans and other materials leaves the embassy through the special exit and boards the waiting plane.

Both BALLBLAZER and SPY VS. SPY represent top level contemporary head-to-head gaming. They are great-looking, easy to learn and provide untold hours of intense face-to-face challenge.

Things are looking good for fans of two- and multiplayer computer games. Most of the games mentioned in this article have proven popular with gamers, so there's every reason to believe that alert manufacturers will want to publish more of the same to capitalize on this burgeoning interest.

Another positive sign is that the designers are learning better ways to create head-to-head contests. As the brief history of software has already proven, practice makes perfect, and at least a few authors are starting to specialize in multiplayer programs. By the fourth quarter, some of these next-generation disks should be ready for all of us to enjoy. ♣

BALLBLAZER *Designed by Lucasfilm, Atari-Epyx, 1984/48K disk*

SPY VS. SPY *Designed by Mike Riedel, First Star Software, 1984/48K disk*

Multi-Player Adventures Join the Party

Ali Baba and Return of Heracles

Most adventures are intended for a single player. Oh, the instructions usually refer to the pleasure of getting a group together to work on a quest, but solving an adventure is generally a go-it-alone activity.

Enter Stuart Smith. Use of the keyboard as the primary order entry device made it just about impossible for more than one person to enjoy an adventure at a time. This obviously would not do. What Smith wanted was a fast and easy method which would eliminate jostling at the console.

ALI BABA incorporates a joystick-activated command scheme that permits independent control of each on-screen character. Up to four gamers (on Atari 400 and 800 computers) direct their on-screen surrogates through an Arabian Nights fantasyland to rescue the kidnapped princess. RETURN OF HERACLES, a sequel to ALI BABA, with a Greek mythological theme, further refines the concept.

Although the play mechanics of the two programs differ in many small particulars, the overall approach is the

same. A computerist uses the controller in conjunction with a set of menus. If the gamer doesn't like any of the options on the screen, pressing the action button brings up a new batch of choices.

To win in RETURN OF HERACLES, the players must complete the legendary 12 labors. Participants choose from an extensive roster of Greek heroes, heroines and demigods. The more characters brought into the adventure, the simpler it is to finish successfully.

For a gaming experience that's really different, take a look at these excellent programs. (Smith's ADVENTURE CONSTRUCTION SET, which lets even nonprogrammers create adventures of this type, will soon be published for Atari computers by Electronic Arts.) ♣

ALI BABA, *designed by Stuart Smith, Quality Software, 1982/48K disk*

RETURN OF HERACLES, *designed by Stuart Smith, Quality Software, 1984/48K disk*

The six most commonly used excuses for bad spelling.



It was three o'clock in the morning...



I was in a real rush.



It was only a typo...



My computer did it.



My printer messed up.



I didn't have ATARI Proofreader.

There's no excuse for excuses. Because ATARI Proofreader catches every spelling error. And highlights it unmistakably.

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complains      complement
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complemented  completedn
Atari Proofreader is the
Compliment to AtariWriter
spelling checking ability
the usefulness of program
user. It is very easy to use
it uses the same commands
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The built-in spelling dictionary includes over 36,000 words. And you can create your *own* dictionary

of special words. So you'll look up the correct spelling for *any* word right on your screen.

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HIGHLIGHT Errors
PRINT Errors
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LOAD Personal Dictionary
Return to ATARIWRITER
SAVE Personal Dictionary
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Proofreader is as easy to use as AtariWriter. Because it's designed exclusively for AtariWriter.™

In fact, it only takes about five minutes to review a 1500-word document. And five minutes is not much of an excuse for turning out documents with spelling errors. No matter how late it is.

The ATARI® Proofreader™
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A New Angle on Personal Computing

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ATARI's 130XE Personal Computer. Under its hood is technology so new, that it is able to deliver 131,072 bytes of Random Access Memory for less than you ever imagined! In fact, it's now the most affordable, value-packed PC you can own.

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